

Urban Integration of Historic Centers

Analytical Study of the Factors of Urban Integration at Al-Karkh Historic Center¹

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Abstract:

Historic centers are considered one of the tangible forms of civilization in terms of depicting the extensions of the past. They form one of the intensively proposed controversies in the modern field in regard to the possibility of dealing with them, the objectives of development and conserving them as they represent the merge of the old and the new. This is manifested in the merger of contradictions and the changing value resulting from urban interference in order to link the historic centers with other parts of the city through linear streets that penetrate its urban structure and divide its urban texture, causing a common problem for most Islamic Arab historic centers.

Several of philosophical, theoretical and architectural theses have concentrated on identifying the relations between the new and the old of the historic centers, such as the relation of urban integration that represents the integration of urban environmental components in regard to the social, economic and environmental function and its integration at the physical aspect. Through studying and analyzing the urban theses that deal with the factors of urban integration at the functional and physical level and the urban theses that discuss the transformation of urban structure. According to this perspective, the research problem was identified as follows: the absence of a clear vision of the urban integration factors at the visual and cognitive levels between the new (the penetrating linear streets) and the old urban fabric in the structure of historic centers through the feature of transformation in its urban structure. As for the research thesis, it is related to employing the penetrating linear street to achieve the urban integration at the visual and structural levels through the feature of transformation at the structure of the historic center as a basic condition to achieve urban integration. This research aims at:

- 1) Detecting the factors of urban integration between the old and the new in the urban structure of historic centers at the visual level by the integration of the urban scene and at the constructional level by the constructional integration of urban structure.
- 2) Identifying the mechanism of transformation to conserve the urban structure system of the historic center in a way that achieves urban integration.

For the purpose of treating the research problem and maintaining the objectives and theses of the research, a hypothetical form of urban integration for historic centers was built in a way that embraces the factors of urban integration and the methods of urban structure transformation.

The research has adopted the rules of spatial syntax in the analysis and measurement of urban integration factors, through identifying the structural characteristics of the historic

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urban structure and the implementation of the transmission mechanisms of urban structure. The types of the urban structure were analyzed based on the analysis of the elected urban structure using the spatial relations (topology) of the urban structure elements (bulk and space) and analyzing the same using mathematical tools that brings the elements together to a specific level.

The results showed that the achievement of urban integration of historic centers could be completed in two stages; the first is the transmission of urban structure through the utilization of one of the transmission mechanisms and their application concepts (at the comprehensive level of the structure) and the second is the achievement of urban integration factors through structural characteristics (comprehensive and topical) of the urban structure where they used the transmission concepts in re-employing the penetrating linear streets to achieve urban integration between the linear street and the old texture. The results showed:

- 1) An appropriateness of two concepts of the transmission of the urban structure of historic center; which are restructuring the urban structure and the original compositional method for the pattern to achieve the urban integration at the comprehensive level through the achievement of high values to measure the clarity, centrality and directionality of the urban structure.
- 2) Achievement of the factors of urban integration between the old and the new through conserving deep compositional characteristics (comprehensive and topical) of the original urban structure for Islamic Arab historic centers that were tested to measure these properties. During the process of finding a solution for the research problem, a solution for the general problem can be achieved; which is a penetrating linear street that forms the center of the structure of the historic center. It should be reused and approximated to the old main commercial axes in regard to its compositional relations to the old urban structure.

Urban Integration in Historic Centers

Analytical study of the urban integration factors at Al-Karkh Historic Centers

1. Introduction

This research discusses one of the main problems that encounters the Islamic Arab historic centers and all changes and transformations affected these centers by time after attempts made to merge the historic centers with the remaining civil sectors through basic design plans, urban development strategies and comprehensive transportation plans, which result in shredding the old urban fabric, the loss of visual and compositional characteristics and the weak potential of achieving the physical and social requirements of the occupants of these centers. These centers are threatened by damage and destruction because of the type of urban planning that resulted from the impact of industrial development and the impacts of market and economy forces in all societies.

1.1 The General Problem

It is identified in the linear streets penetrating the structure of the Islamic Arab historic streets that caused a breaking down in the urban structure of these centers as a result of replacing part of its fabric with other new ones, causing a segregation that appears in the urban scene and in the compositional of the urban structure. This leads to a social segregation and lack of communication between the old and the new of the historic center.

These theses with their different intellectual trends confirmed that the deficiency was the result of adopting modern intellectual trends in the urban design in order to find the relation between the old and the new of the historic centers; regardless of the time-spatial context of the urban structure and society. The research depended on studying the urban environment of the historic centers as an integral structure. It focused on the Islamic Arab historic centers and the characteristics of their (deep) basic and formal urban structure. The research discussed the treatment of the problem through introducing the concept of urban integration between the old and the new of the urban structure of historic centers as a relation between the old and the new. In light of the discussions of the studies and researches that handled the general problem under this concept, the research problem was identified in the lack of a clear vision on the factors of urban integration at the visual and compositional level between the new (penetrating linear streets) and the old structure of the historic centers through the property of transformation of their urban structure. However, the research thesis was correlated to the possibility of re-employing the penetrating linear street to achieve an urban integration visually and compositionally in the historic centers through the transformation property of its historic structure.

1.2 The methodology of the research

In order to achieve the objectives of the research, it was required to adopt a methodology that was correlated to:

- a. Building a theoretical base that embraces the concept of historic centers; defines their properties, the features of their urban structure, the concept of integration and urban integration, the analysis of their factors at the comprehensive and topical levels and reaches their basic objectives, in addition to the concept of transmission in the urban structure

through the study and analysis of the urban design trends and the theses with their various intellectual trends and applied concepts.

b. Adopting an analytical methodology for the compositional characteristics of the deep structure by analyzing the urban structure under two stages; the completion of the urban structure stage before the urban intervention policies and the second stage takes place after the introduction of the penetrating linear street; utilizing the modern trends of transformation and the implementation of two trends thereof on the historic urban structure so that each of them represents a stage; in addition to the measurement of the scope of the impact of these transmissions on the compositional characteristics of the original structure and the implementation of this methodology on a realistic urban structure (Al-Karkh Historic Center).

c. Concluding the scope of impact on the compositional properties as factors of urban integration at the compositional level and the applied concepts of structural transmission in achieving an urban integration between the penetrating linear street and the old urban structure of historic centers.

2. Historic Centers:

They are vivid urban centers connected to the present. They have civilized values and includes material and non-material components of the city's heritage. They represent a tool of balance and integration to face the rapid urban change in the city. They carry the history of the city with all its material and subjective dimensions (All the cities around the world that were simultaneously or intentionally produced and developed shape the material changes of the cultural differences of the societies over the history; therefore, they are historic).

As for the main distinct of these historic cities among other urban environments is the **continuity of life** and their **civilized values**. The continuity of life in the historic centers can be classified as the continuity of social, economic and physical life. One of the reasons for maintaining these historic centers is manifested in the need to continue the social position and to correlate it to the memories of the occupants of these centers. They represent an embodiment of historic events and times and influencing personalities and a translation of special living phenomena that give a continuation of the spring of civilization over the ages. As for the economic continuation, the historic centers represent one of the economic resources of the city being historic, commercial and sometimes religious centers of attraction; thanks to their material and non-material heritage. Economists have other points of view for the urban heritage as an economic value in terms of their works and craft that represent the non-material heritage or in terms of investment and tourism. The importance of the economic continuity of historic centers appears at their architectural level through what is called the "use value". This value results from utilizing the historic building or a set of buildings for material returns higher than the returns of utilizing other non-heritage buildings. This value can be direct and consumable of the heritage building or indirect such as the impact of heritage buildings on other neighboring buildings⁽¹⁾. The idea of physical continuity of historic centers is represented in the concept of preservation. In the general concept, it is defined as the attempt to achieve the directions for continuity and conservation through the use of the best available methods⁽²⁾. ICOMOS has identified the civilized values in the Burra Charter for the conservation of places of cultural significance (1981). The civilized values are represented in the aesthetical, historic or scientific value or the social value of the past, present and future. Throsby has divided the civilized value into

six values⁽³⁾. They are: the aesthetical value of consistency and beauty; spiritual value of understanding, enlightenment and vision; social value of communication with others, the feeling of identity and the collective memory; a historic value in contacting with the past for being a historic document that no one should interfere with and all should maintain its safety and purity as much as possible; a symbolic value for storage or transport of meaning and a value of originality in being unique and the safety of building.

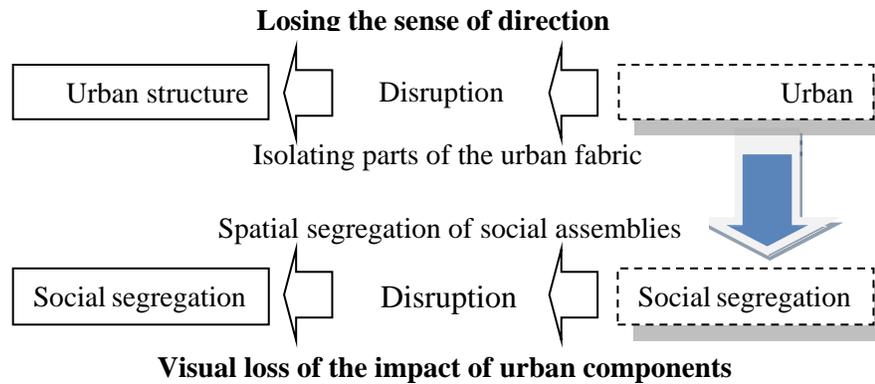
The basic urban structure of Islamic Arab historic centers is distinguished with a set of characteristics; of which the most important is the integration of blocks and spaces that appear in the historic centers with organic urban fabric⁽⁴⁾; the comprehensive integration of the urban structure as the person understands many aspects of the spatial organization structure and the clarity of comprehensive structure upon moving in the spatial structure of the traditional environment⁽⁵⁾; the integration of conceptual structure with the spatial structure and the actual use of location in the urban structure of the historic centers where there is a lack of such integration⁽⁶⁾; the centrality and the gradation of urban structure, which includes several grades (social grade, spatial grade, positional grade and structural grade in the paths of movement and centers)⁽⁷⁾; containment and inward direction.

Moreover, the apparent formal characteristics of the Arab and Islamic historic centers represent a reflection of a doctrinal, social, cultural and environmental system. They were described by John Warren as coherent, irregular, low-altitude, conservative and organizational of parallel societies (social integration represented in the similarity of social classes)⁽⁸⁾. They are represented in the unity of formation, consistency of the parts of the architectural heritage fabric, high visual density of the urban fabric, visual continuity and consistency and variation within the unit.

In addition, there are the cases of transformation and discontinuity of the urban structure of Islamic Arab Historic centers as this discontinuity leads to urban segregation. Weinberg has defined the deep structure as a system of transformations. Therefore, there must be a distinguished identity for the deep structure to enable it to function and generate phenomena through transformation. The identity of the deep structure is correlated to the characteristics of transformations that form its systems in terms of (the number of transformations and the type of transformations). These transformations represent the processes of interaction that eventually form the complete system. They are classified as system maintaining transformations and system disrupting transformations. The second leads to the creation of new types of phenomena⁽⁹⁾. Whereas the discontinuity was correlated to the transmissions that affect the essence and when the transformation deviate from the pattern of the internal structural transformations, the result will be separated from the origin, while the transmission of the structure will be according to the pattern and has a specific rate of being connected to the origin. Antoniadis refers to the possibility of studying transmission of shapes with references only. However, the study of transformation of disrupted shapes is very difficult due to the lack of connection to the origin⁽¹⁰⁾. The disruption may be due to changes in the thought and methods that were used in the urban design and manner of dealing with them. Extreme ideas lead to concessive resolutions and their circulation and exclusion caused the disruption. Plan(1)

Linear streets that penetrate the structure of historic centers appear as the most importance causes of disruption and segregation of the components of the urban fabric and the spatial segregation that causes the urban segregation such as the imposition of a social structure in a space or segregating the social structure, which in turn leads to social segregation of these

centers. This is the general problem of the research. Urban intervention policies in historic centers have depended on using the penetrating linear streets as a main goal to correlate the historic centers to the new sectors in the city.



Plan(1) Disruption of the urban structure/ The Researcher

The method of penetrating linear streets included the removal of part of the old compact urban fabric and opening a straight and wide road, unlike the surrounding tight paths in the historic centers; the use of high buildings alongside the street (completely closing the urban scene) for the benefit of the new urban scene; the treatment of intersection points (with minor roads) in the squares with monuments. Linear streets were often crossing the original network of the alleys at sharp corners, where they mostly were inconsistent with the shape of the traditional city⁽¹¹⁾. As a result, the method of penetrating linear streets has removed several numbers of heritage buildings and fences of historic centers; thus, disrupting its urban structure. At the planning level, most constructional intervention projects for the Islamic and Arab historic centers in the 20th century have included upgrading and serving the already-established commercial centers in its historic centers through using wide streets for penetration. Despite all of these negative reflections of these projects on the urban structure of the historic centers, the main purpose of the penetrating streets is connecting the historic centers with the remaining sectors of the city, using the main network of transportation and movement and the infrastructure servicing network as a main distributor, considering that it is difficult to introduce them to the narrow and twisted alleys of the historic centers. That helped the establishment of two lines of high buildings alongside the penetrating streets in the historic centers. The main features of the penetrating linear streets can be identified in the following:

- a. They penetrate the urban structure of the historic centers to reach outside. They constitute the main correlation element between the historic centers with the remaining sectors of the city in regard to: providing transportation and traffic (convenient movement) and the delivery and distribution of modern infrastructure services in the historic center.
- b. They provide the widest visual extent to embrace the physical components of the historic centers as they won the largest open space in the historic center.
- c. Two lines of the high buildings (alongside the penetrating streets) have dominated on the urban scene, providing a bigger opportunity for the urban design and the appropriate architectural treatments in the site.

d. They provide the element of economic continuity in the historic center through mostly the importance of commercial use of its buildings as the linear streets represent the center of general and various events.

However, the main negative reflections of penetrating streets are the following:

a. Linear streets cannot be established unless after the removal of areas of the urban fabric of the historic center.

b. Dividing and destructing the urban structure of the historic center and disrupting the physical visual unit of the historic center.

c. Causing urban segregation of the low-altitude traditional urban fabric from the urban scene. It makes a visual and social segregation through segregating the residential area of the historic center from the general new spaces and segregate it from the remaining parts of the center; social segregation among the society of the old fabric and the high residential buildings, together with the environmental segregation (through the sun and wind)

d. Encouraging the transit of vehicles into the historic center and the resulting urban problems.

e. Encouraging the change of residential use of the old fabric into other hazardous uses, causing the destruction of the residential and social environment of the old fabric of the historic center.

Therefore, penetrating linear streets establish two relations with the historic centers:

- The relation of the new (linear streets) with the old fabric of the urban environment of the historic centers.

- A correlation between the historic centers to the remaining parts of the city (the relation of the urban environment of the historic center with the city environment).

Table (1) refers to a number of historic centers in the Arab countries; including Baghdad that includes penetrating linear streets and their major features. Figure (1) illustrates some of these features.



Figure (1-A) Al-Khandak Street (*the historic center in Aleppo*)



Figure (1-B) the old and the new in the Gold Street (*Historic center in Jeddah/ the Sacred Jeddah*) Municipality website



Figure (1-C) the urban design of the Caliph street (*Al-Resafah Historic Center*) – Source: Baghdad Secretariat – Al-

3. Integration and Urban Integration:

3.1 Integration: It is the achievement of the whole, totality, completion and unity⁽¹²⁾. Its procedurally defined as an action or a process of unifying recognized scattered parts to reach a physically or functionally recognizable unification.

Integration has prevailed philosophical and other theoretical trends:

Integral thesis include philosophical trends and the Holy Quran mentioned the integration and the integral theory. Integral theses defined the term "whole" as a trend based on the relation between the "whole and its parts". He introduced the concept of "whole" that aims at embracing the surface but fails to analyze it. However, scientific researches assume analyzing the whole into parts, making it is possible to being studies as relations among the group of the parts. Therefore, it proposed methods to divide the whole, as it can be randomly divided into a group of unconnected parts or can be divided according to a specific vision or understanding with an emphasize on some principles that do not deform the basic characteristics of the structure or the whole can be divided according to the connected structure where the parts form whole units; provided that the presence of any part is not compulsory; yet it has its own self presence but it is at the same time delighted for being part of the "whole". Meanwhile, Islam was concerned in the theory of integration and human integration, as it is not only a set of worships, but a set of strict rules and immortal instructions that guide the human in his relations, work and personal, social and civil life. It follows the systems of prophets. Hence, the Islam has established the principles of virtuous city that deal with the self and aim at achieving happy material life for the integration and development of the self⁽¹³⁾.

Integral theory refers to the comprehensive organizing philosophy that was originally developed by the psychologist Ken Wilber in 1997⁽¹⁴⁾. The integral theory is based on the ideas of previous scholars of integration such as Gebser, Jurgen, Habermas, and James Mark Baldwin, but they include several new elements too. The integral trend, according to Wilber, may contradict with other methods such as the legendary and rationality that tend to partial analysis and incomplete solutions that are less effective and less balances than integral solutions. He defined the integral philosophy as ideologically wider than any other schools (pre-modernity, modernity and post-modernity) as it includes the best of all and avoids all possible extreme.

However, Rush theses discussed the theory and definition of integration through describing the systems of construction. Integration always and unintentionally appear in the design of buildings. This theory aims at making the integration a realistic or intentional action in the designing process.

The integrally conscious thought allows distinguishing and selecting the buildings forms, as well as making them changeable, which was called for by the theory of integration through a group of mutual relations among the groups. This theory assumes that the building can be divided into four main groups; which are the constructional structure group, the internal spaces, the external cover and the services. By setting each group on a corner of a three-dimensional pyramid, this engineering expansion of this idea generates 11 bilateral, trilateral and quadrilateral unions according to the five levels of integration (separate, adjacent, connected, interlocked and unified)⁽¹⁵⁾.

The objectives of integration are reducing the time, material and space used in building and increasing the events that can happen within it and the result is the balance. The mission is

represented in concluding the idea of construction and the integral system and the achievement of the objective represented in creating a theory and symbolic terms that allow the discussion of the strategies of integration before and after the selection of specific material systems. The integration is defined as a tangible or readable appearance in the materials and machineries that form the building. The integration of standards is clear in the possible actions of the building. Each designing decision do not identify the tangible material unions and the material interaction levels only; yet it easily specify the completion of intentional events. Thus, the building represents an implied reference that hampers or reinforces the event⁽¹⁶⁾.

Architectural thesis, according to each of L.R. Rachman, Robert Venturi and Rush, referred to:

- The idea of visual integration and the concept of the four systems of architecture, represented in the structural system, cover, services and the inside. Each of these systems is placed in the head point of a tetrahedral shape to geometrically and spatially describe the implied theoretical location and obtain a mutual effect that is called the tetrahedron system. The wide variety of the aesthetics of the integration of the architectural systems has given a special recognition for each architect regarding the method of construction⁽¹⁷⁾.
- The achievement of integration through achieving the concept of (the difficult whole) that deals with the relation between the whole and the part; i.e. the relation between the system of the whole and the system of the parts in the architectural work, emphasizing on the relational formal characteristics based on Gestalt psychology that constitutes the whole sense more than just the result of binding the parts together⁽¹⁸⁾.
- Identifying three patterns of the integration of buildings and they are: physical integration in the method of subscription and consistency between the systems and constructional components in the space; visual integration in the method of subscription among the constructional components in order to collect and create the shape of the authority; the integration of performance in the method of subscription and consistency between the systems and constructional components of the position⁽¹⁹⁾.

3.2 Urban Integration; The research is concerned on finding a comprehensive relation to reconnect the components of the old and new urban fabric or the new and old urban components within the historic center as the research discussed the concept of urban integration that contradicts the concept of urban segregation.

Hillier identified the city as the result of a physical and functional mixture. It physically represents a storage of (spatially) interconnected buildings using a spatial system and infrastructure; while it functionally supports a set of social, economic, civilized and environmental operations. The city states a group of goals and methods in which the social and civilized goals are achieved through physical methods. The defect of the urban structure of the city comes from the failure to understand the relation between the methods and the goals; i.e. between the physical assembly of the city and its function⁽²⁰⁾.

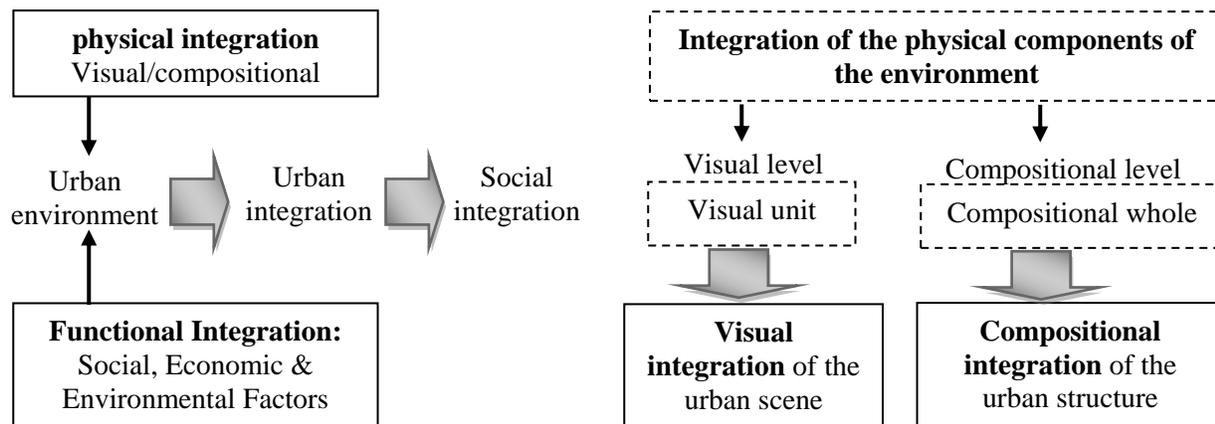
Therefore, urban integration is the integration of the urban environment components in terms of their functional (social, economic and environmental) factors so that they achieve an integral urban performance which is the functional integration and the integration of the urban environmental components at the physical aspect to reach each (visually and compositionally) unification. This integration is achieved through functional and physical mixture and aims at achieving social integration instead of social segregation, as illustrated

in plan (2). Considering that the research is specialized in the urban integration of the historic centers between the old and the new, the integration of the physical components of the structure of the historic centers have the major effect in directing the path of the research towards the urban integration at the level of physical components. Based on the above, two levels can be defined to achieve the integration of the physical components of the urban environment and they are, plan (3):

The First Level: the visual level: the form or visual unit of the physical elements that visually recognized through the urban scene; i.e. the integration of the urban scene of the historic center that includes the old and the new.

The Second Level: the compositional level: the compositional integration of the urban structure of the historic center.

The research dealt with the transformations of the urban structure of the historic centers for being one of the major characteristics of the structure. The concepts of transformation have revealed an impact on the compositional characteristics of the urban structure through the theoretical theses and urban morphologic trends. In light of analyzing and discussing related theses, there appeared a lack in knowledge and thus the identified problem of the research, the thesis and the objectives of the research. Based on the research thesis and through the feature of transformation of the urban structure, the penetrating linear street of the historic center would be re-employed in order to achieve the urban integration and the urban structure of the historic centers would be restructured around the penetrating linear street for the sake of returning the urban integration therein. That requires introducing a number of design examples that adopted theoretical trends in order to identify additional terms that can be utilized.



Plan 2 urban integration/ the researcher

Plan (3) urban integration at the physical level /the researcher

4. Theoretical Frame

The terms of theoretical frame were distributed at three levels:

4.1 **Visual integration/ visual level:** through two terms and they are:

Comprehensive visual integration: in the regularity of the urban scene, the visual correlation among the streets, open spaces and facades, the organic correlation of the parts and the physical correlation of the contract.

The subjective visual integration: in the visual correlation among the streets, open spaces and facades, the contextual idea, the spatial containment, solitary, visual gradation and the visual field, as detailed in table (2).

4.2 **Compositional integration/ compositional level:** they include two minor words:

Comprehensive compositional integration: in terms of the clarity, centrality, spatial and trends of the urban structure.

Topical compositional integration: in the regularity of urban structure, consistency among the parts; penetration of the parts in the continuity of visual and dynamic axes among the parts; variety of topical characteristics, spatial gradation, privacy (events), spatial volumes, openness and closure, as detailed in table (3).

4.3 **Urban integration at the level of concepts of transformation in the urban structure:** through two minor terms as follows:

Comprehensive concepts: in the volume pattern of the old urban fabric cells as a volume identifier of the new building, the use of flexible dynamic urban network, the integration of controversies, the liner axes correlating the poles or the contract and re-structuring of the old fabric.

Topical concepts: In the original compositional principle of the architectural and urban patterns (the use of pattern), the re-urbanization through the continuity of urban fabric (the relation between the pole and the fabric) and (returning the fabric to the urban scene), as detailed in table (4).

5. Practical Study

The research has adopted the rules of spatial composition in analyzing and measuring the compositional specifications of the urban structure. These were used in the theoretical frame as factors of urban integration at the compositional level through two morphological stages for the urban structure. In addition, these specifications were analyzed and measured under two stages in order to implement two concepts of transformation in the urban structure. The methodology of morphological analysis of the urban structure requires the use of spatial relations (topology) among the elements of urban structure (Mass and Space); together with an analysis of these relations using mathematical tools that connect the elements together to a specific rate that is called spatial configuration. The spatial configuration is defined as the study of the relation between components of the urban structure that takes into consideration other relations at both the comprehensive and topical levels, using the graph theory.

According to this theory, the urban structure consists of a number of systems that intertwined at different degrees; those apparent expresses the apparent or clear system which requires an effort to recognize what is hidden or implied. The methodology deals with the urban structure as a bi-polar system that is formatted from spatial relations (adjacency – approximate – continuity) among the cells (urban masses) from one hand and the external surrounding of the urban structure (borders) from the other hand. The cells constitutes the limits that achieve the social existence at two levels; the level of physical

limits that separate internal-external spaces topically and the level of social limit that separates the urban structure from the external world comprehensively.

5.1 Analyzing the urban structure and the method of analysis: The urban structure is analyzed based on two significant steps:

- Representing the comprehensive urban structure based on fundamental elements (urban spaces) and the connecting spatial relations.
- Correlation of these spaces to prepare a correlation graph.

The compositional characteristics that generate the surface structures can be defined through two main features that specify the distribution and circulation of movement among the parts of the urban structure. They are⁽²¹⁾. : Symmetry and anti-symmetry in expressing the compositional characteristics of urban spaces and diffusion and anti-diffusion that express the compositional characteristics of urban spaces.

The analysis method that is called "Alfa Analysis"⁽²²⁾. depends on the graphic expression of the compositional relations of the urban structure, represented in the compositional relations among the urban spaces that define the spatial relations of the urban masses, where each point of the urban environment constitutes part of a single-dimension extended space and part of a convex space that represents maximum two dimensional extension of the space. It is possible to differentiate between any urban pattern and the other through unilateral and bilateral extensions and the type of the relation between the two extensions. The measure of compositional characteristics of the urban structure aims at identifying indicators of urban integration and the methods of their measurement, through:

- Identifying a deep structure measure that expresses the comprehensive and topical compositional characteristics.
- Identifying a measure for conformity between comprehensive and topical compositional characteristics of the urban structure.

This measure tries to express the correlation between parts of the deep structure on one hand and the method of their distribution among parts of the urban structure on the other hand; through which the deep structure can be concluded and which covers:

- 1) The centrality of the urban structure: it is measured by **the core of integration** indicator. It represents the center of the structure though the relation between the center and the borders.
- 2) The altitude of the urban structure: it is measured by **the core of the option**. It represents the altitude of movement distribution among the parts and represents the shortest way outward.
- 3) The clarity of the urban structure: it is measured by Pearson's correlation coefficient (**r**) between **the comprehensive and topical integration features**.
- 4) Spatiality of the urban structure: it is measured by the compatibility between **comprehensive integration feature and comprehensive option** using Pearson's correlation coefficient that clarifies the relation between the center to the border and the extension of the spatiality of the structure towards the external surrounding.

5.2 The urban structure selected for the practical study

The process of selecting the urban structures for practical study has required performing a prompt survey for the patterns of urban structures in the city of Baghdad. The survey covered historic centers in **Kadamyia, A'admyia, Al-Resafa center** and **Al-Karkh Historic Center**. Based on the results of analyzing the compositional characteristics of the urban structure above, the urban structure of Al-Karkh Historic Center was selected for the following reasons:

- Clear morphological borders of the urban structure and conservation of its most compositional features despite changes in the main parts of the sector.
- It represents one of the urban patterns that prevail in the Islamic Arab historic centers which contain a central axis (industrial – commercial).
- Variety of the options of use, reflecting various compositional characteristics due to the different positional requirements, through which the compatibility between compositional characteristics of the urban structure and its function can be explained.
- It has achieved the sensitive and social requirements of its occupants for long periods.

Al-Karkh Historic Center: The study area is located at the west bank of the Tigris . it is one of the oldest districts in the city of Baghdad. Together with Al-Resafa Historic Center, it constitutes the downtown of Baghdad city according to the basic design law. The center includes many residential areas that are distinguished with their traditional heritage architectural character, developed over the long centuries and completed in the middle of the 19th century. It has four doors; Kuraimat, Al-Hela, Al-Sheikh Marouf Al-Kerkhi and Al-Kadamyia doors). This urban fabric has been preserved for a long time without any essential change. In the last decade of the 19th century, its urban fabric started to tear. By the year 1982, 17% of the old fabric was removed under Haifa street development project. Haifa street is 2.4 km length. The urban fabric of Haifa street residential complex occupies 27 hectare within Al-Karkh center that represents 17% of Al-Karkh historic center as the center area is 160 hectare. Proposals for urban design for Al-Karkh historic center were received in the proposal of the comprehensive developmental design of Baghdad City (1973-2000) Polservice & Miastoproject, and Al-Karkh Development Study Proposal 1982 (Muaz Al-Alusi, Raynica and Parson Brown).

5.3 Analysis of the selected urban structure:

The analysis of the selected urban structure aims at measuring the factors of urban integration of through its comprehensive and topical compositional characteristics compared to the visual and dynamic step. According to this measure, it appears that the urban structure has its compositional characteristics in terms of the correlations among its spaces together. The borders have major role in comprehensively and topically identifying its characteristics, which reflects a difficulty in cutting any part of the structure and separate it from other correlation randomly. In addition, it will be important to treat the effect of the structure' borders in the accuracy of the analysis results, requiring a comprehensive analysis of the urban structure within its clear borders, through the following:

- 1) The research depends on the morphological analysis of two morphological stages of the urban structure (First Stage in 1900 – the Second State in 2008) in order to fix the actual morphological borders of the structure, the index and measure of its comprehensive compositional characteristics as factors of urban integration.
- 2) Concepts of transformation in the selected urban structure will be implemented on two proposals that represent two conceptual trends for the transformation of the urban structure of Al-Karkh Center after the second state (i.e. after the construction of Haifa Street). The urban structure of each proposal will be analyzed separately. The research sample contains four morphological stages; considering that the research follows transformation of compositional characteristics for each morphological stage. Accordingly, successive morphological analysis will be carried on under the following steps:

First Steps: Preparing axial plans for each of:

- a. The urban structure for the first morphological stage, that includes the organic fabric of the residential parts and their relations to the historic axis that represents the commercial center of the historic center.
- b. The urban structure of the second morphological stage, that is represented in removing part of the urban fabric and the construction of a linear penetrating street which contains high buildings (Haifa Street). The urban structure after the implementation of the fundamental composition method as one of the conceptual trends of transformation in the urban structure of the historic centers. This stage represents the third morphological stage.
- c. The urban structure after reweaving the urban fabric as one of the conceptual trends of transformation in the urban structure of the historic center. This stage represents the fourth morphological stage.

5.4 Analyzing the results of the practical study

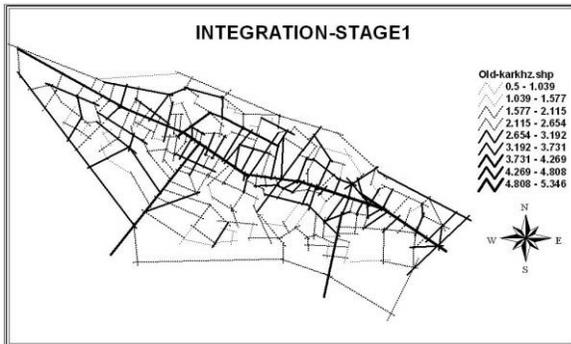
The research depends on the successive morphological analysis in order to analyze the selected urban structure for the following morphological stages:

First Stage 1900: It represents original urban structure, (figure 2), that contains an organic fabric consisting of residential buildings and spaces of winding movement. It contains a central movement axis that connects Al-Kazemia gate and the eastern north side gate of Al-Karkh Center. However, figure(3) with its four parts (3-1/3-2/3-3/3-4) illustrates the correlation coefficients of the integration and comprehensive option and the correlation coefficient of spatiality and clarity.

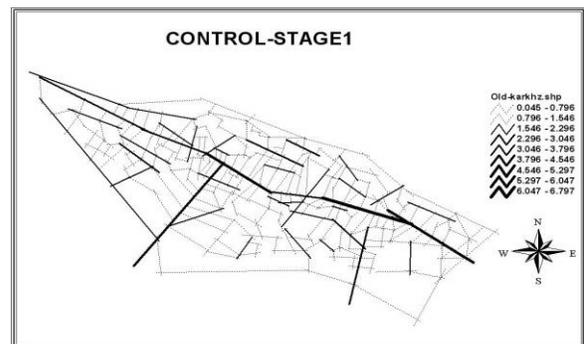
Second Stage in 2008: Analyzing the actual status of the urban structure for the current morphological stage after the removal of part of the urban fabric in order to open Haifa street (replacing part of the old fabric with a new part), figure (4), table (5). Based on the indicators of the theoretical frame that dealt with methods of transformation in the urban structure as illustrated in figure (5), two concepts of transformation will be implemented. Each concept represents a proposed morphological stage that will be analyzed. It will be called the third stage and the fourth stage.

	Correlation rate	Altitude (comprehensive rate option)	Topical integration rate	Centrality Comprehensive integration rate	Clarity	Spatiality
Central Axis	12	4,413	1,69	3,874	0.72	0.68

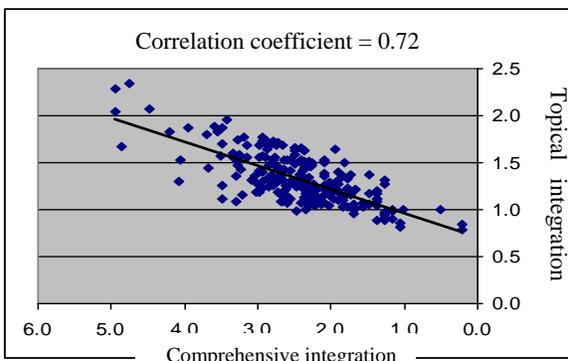
Figure (2) Al-Karkh historic center 1900/ First Stage



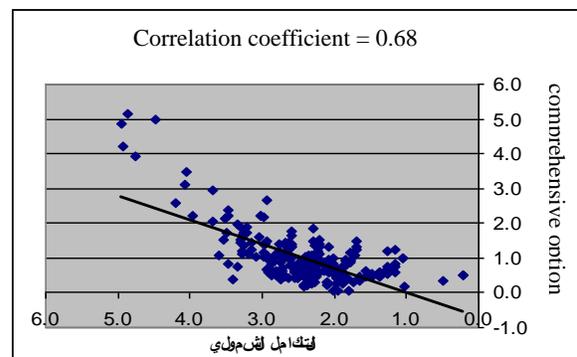
3.1 comprehensive (First Morphological



3-2 Comprehensive Integration (First Morphological Stage)



3-4 Spatial Indicator/ First Morphological Stage



3-3 Clarity Indicator/ First Morphological Stage

Figure (3)/ Indicators of the First Stage 1900 Rates

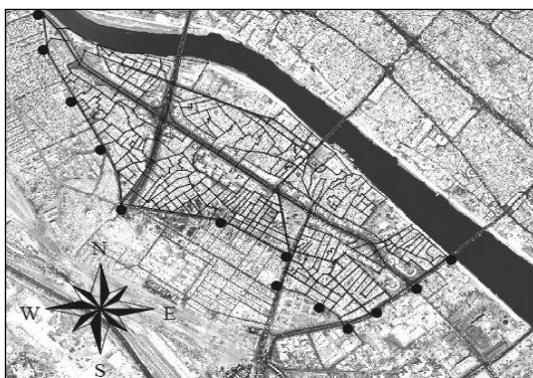


Figure (4) urban structure of the morphological- second stage

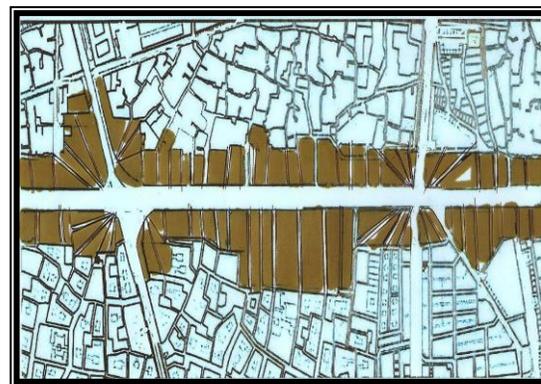


Figure (5) Reweaving the urban structure/ third stage

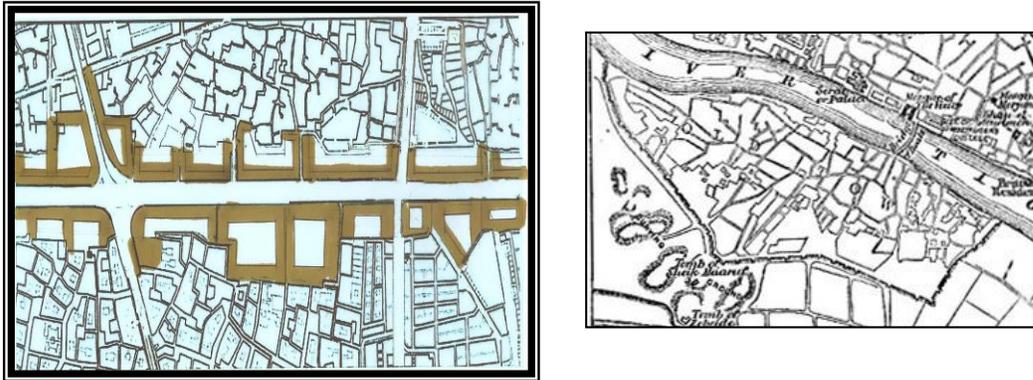


Figure (6) Concept of fundamental composition method / fourth stage-changeable concepts/ researcher

The Third Stage. It is represented in applying the concept of reweaving the urban fabric, where an integration between the old and the new will be achieved at the comprehensive level (for the general structure) and the integration at the topical level through penetration of movement spaces between the old and the new, figure (6), and table (6).

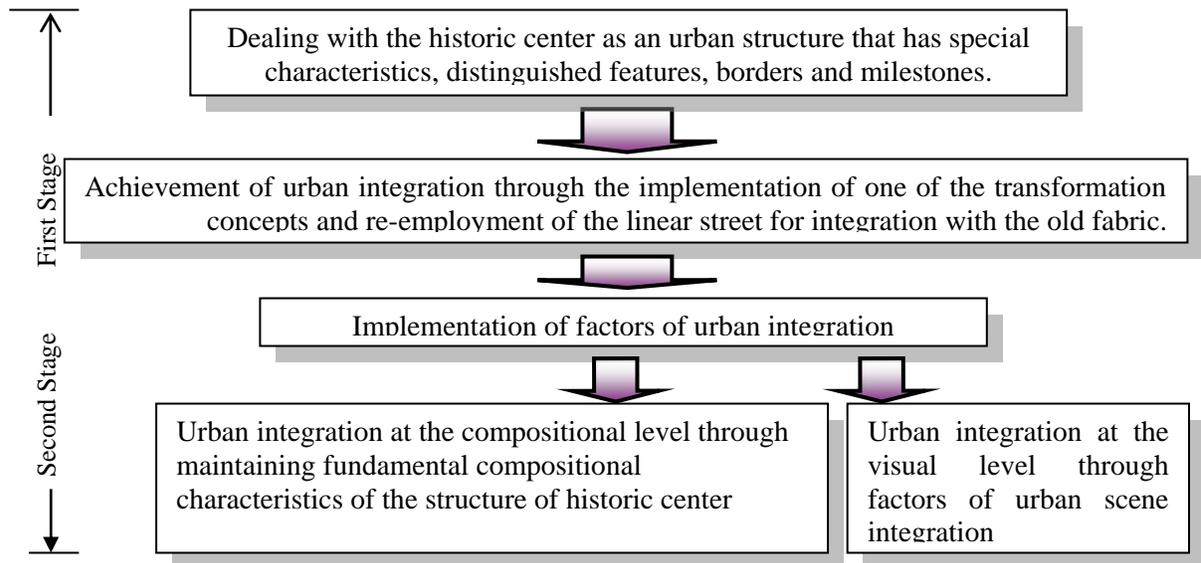
The Fourth Stage: It is represented in applying the fundamental composition method of the spatial or constructional pattern, figure (6) and (7) and table (6). It confirms the fact that the city was used as a source of urban design to generate new continuous patterns with the past of the city. Integration between the old and the new at the comprehensive level (for the general structure) and integration at the topical level through spaces that connect the old and the new.

6. Conclusions

Conclusions of the theoretical frame: The treatment of the urban environment of the historic city as an integral structure includes both the physical and functional sides. The achievement of urban integration between the new (the linear streets) and the old (the old urban fabric) in the Islamic Arab historic centers is based on the integration of physical components, as the historic centers represent an urban structure with fundamental composition characteristics with material forms based on the social forces that generate the compositional relations of the deep structure and the fixed genetic patterns that specify these centers. It is necessary to conserve these characteristics and achieve the urban integration through two stages:

First: the stage of implementing the concepts of transformation (as a comprehensive solution), which restructure the urban structure pursuant to the fundamental compositional characteristics, based on re-employment of the linear penetrating street.

The **second stage:** it represents the implementation of factors of urban integration, which are the factors of urban integration at the visual level through factors of urban scene integration and factors of urban integration at the compositional level through conservation of the fundamental compositional characteristics of the historic center structure, plan (4)



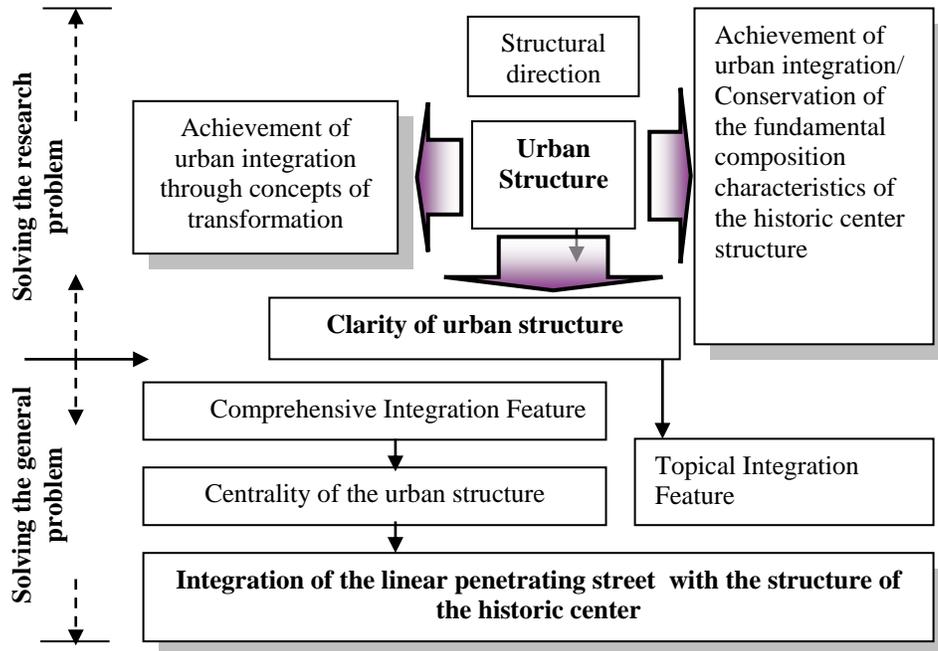
Plan (4) Methodology of Urban Integration at Historic Centers

Conclusions of the Practical Study

- Appropriateness of the concept of reweaving the urban fabric for the transformation of the structure of the historic center in order to achieve the urban integration between the old and the new of this structure, through re-employment of the linear penetrating street as a fundamental factor for implementing the method of transformation in the structure of the historic center under the same compositional relation (for the central historic axes of the urban structure) as it has achieved a clarity value of (0.81) in the urban structure and a centrality rate of (4.43) in the linear penetrating street.
- The concept of reweaving the urban fabric needs an appropriate spatial deepness for the axial spaces that form the fabric in order to avoid the problem of a fabric surrounded by commercial linear streets, which causes a drop in the spatiality of the urban structure, as it reached (0.49) at this stage.
- The appropriateness of the concept of (fundamental composition methodology for spatial or constructional patterns) for the transformation of the urban structure of the historic center in order to achieve the urban integration of the urban structure by re-employment the linear penetrating street as a basic factor in the implementation of the transformation mechanism in the structure of historic center. The value of clarity of the urban structure reached (0.70), the spatiality of the urban structure was (0.57) and the rate of centrality of the linear penetrating street was (3.5). The implementation of a concept of transformation (fundamental composition methodology) for spatial patterns and the use of an urban pattern that is open inward and which is made of a group of buildings surrounding a secondary central space is similar to the (spaces) in the old fabric, where the open space is directly correlated to the axes of old fabric movement in the ground floor.

The research has succeeded in identifying the factors of urban integration between the old and the new in the structure of historic centers that contain linear penetrating streets

through maintaining the (fundamental) composition characteristics of their urban structure, plan (5). The most important features is represented in the centrality of the urban structure; spatiality of urban structure; altitude of the urban structure and clarity of urban structure.



Plan (5) Results of the practical study in solving the research problem and the general problem/ the researcher

Footnotes

- ¹ Throsby, D. 1999. **Cultural Capital and Sustainability Concepts in the Economics of Cultural Heritage...** Document prepared for the Project Economics of Cultural Heritage, Getty Conservation Institute. Los Angeles, p27
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- ⁴ Nigel Harris & Ida Bricius (1996), "Cities and Structural Adjustment", University College London, UCL Press Limited, p48.
- ⁵ Hillier, B&Penn, A. (1993) "Natural Movement" or Configuration and Attraction in Urban Pedestrian Movement; Environment and Planning, Vol. 20, p29.
- ⁶ Lynch, K., (1962), " site planning", Cambridge The MIT Press, p86.
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- ⁹ Weinberg, Gerald M "An Introduction to General System Thinking", 1975, Intrasingence Publication John Wiley and Sons, New York, USA, P23.
- ¹⁰ Antoniades, Anthony C., 1990, "Poetic of Architecture: Theory of Design", Van No Strand Reinhold, N.Y. USA, P68.

- ¹¹ Mihai Ivan – "**Rethinking the Axis: Approaches in the Dment of Communist Initiated/ Uncompleted Architecture in Bucharest**". Master Thesis, Institute of Architecture and Urban Planning, Bucharest, 2006, p.12.
- ¹² Al-Nejaihi, Muhammad Labeeb, **Integral Methods in the Secondary School**, Kuwaiti Teachers Association, 1979, P.2-Arabic Edition.
- ¹³ Ameen Ahmad, **Integration in Islam**, Part 1, Al-Marifa Printing and Publishing House, Beirut, 1996, P 94-125. -Arabic Edition.
- ¹⁴ In 1998, Ken Wilber established a non-profitable institution that adopts setting integral thoughts for solving the increasingly complicated world's problem, which was called the Integral Institution, then the Integral University was established).
- ¹⁵ <http://www.integralworld.net/index.html>
- ¹⁶ Ibid, Rush, 1986, P317
- ¹⁷ Ibid, Rush, 1986, P381
- ¹⁸ Ventori, Robert, **Complication and Contradiction of Architecture**, Translated by Suaad Abd Ali Mahdi, Revised by: Ihsan Fathi, General Cultural Affairs Department, Ministry of Culture and Information, Baghdad, 1987, P. 226-Arabic Edition.
- ¹⁹ Bachman, Leonard R "Integrated buildings: the systems basis of architecture", copyright published by John Wiley & Sons, Hoboken, New Jersey 2003, P32-46
- ²⁰ Hillier, B. & Hanson, J. 1984, **The Social Logic of Space**, Cambridge University Press, Cambridge, PP149-152
- ²¹ Hillier, B., 1996, "Space in the Machine", Cambridge University Press, Cambridge, PP 93-94
- ²² Alfa Analysis was used to analyze the urban structure in a distinguished manner, other than analyzing the internal spaces, which is called Gama-Analysis

Table (1) Penetrating Streets in the Arab Historic Centers/ Researcher

Historic Center	Penetrating Street	Street Features						Longitude of the Street Buildings Floor/m	Longitude of the old constructional fabric Floor/m
		No. of Facades of the Street Buildings	Presence of Service or Segregating Street	Method of Correlation to the City					
				Infrastructure Services	Social Services	Roads and Transportation Plan	Events		
Resafa	St. Al-Khulafa	(1) Facades	Non Available	Integral	One school	Main distributor/ bridges/ metro	Commercial, governmental	8/28	2/7
Al-Kerkh	Haifa St.	(2-4) facades	50%	Integral	Integral	Main distributing road	Residential – governmental	8/28	2/7
Al-Kazemia	Al-Zahra	One façade	NA	Integral	One School	Secondary road	Commercial – religious	5/20	2/7
Jeddah City	Al-Zahab St.	(4) facades	100% Available	Integral	Integral	Main Road	Commercial	5/18	4/13
Aleppo City	Al-Khandaq St.	(1) Façade	NA	Integral	NA	Main Road	Commercial	7/22	3/10
Cairo	Flowers St.	(2) facades	NA	Integral	NA	Secondary road	Commercial, religious	8/28	3/10



Figure (1-G) Al-Zahra Street – Al-Kazemia Historic Center – Source/ Al-Zahra Street Development Study/ Baghdad Secretariat/ 1999

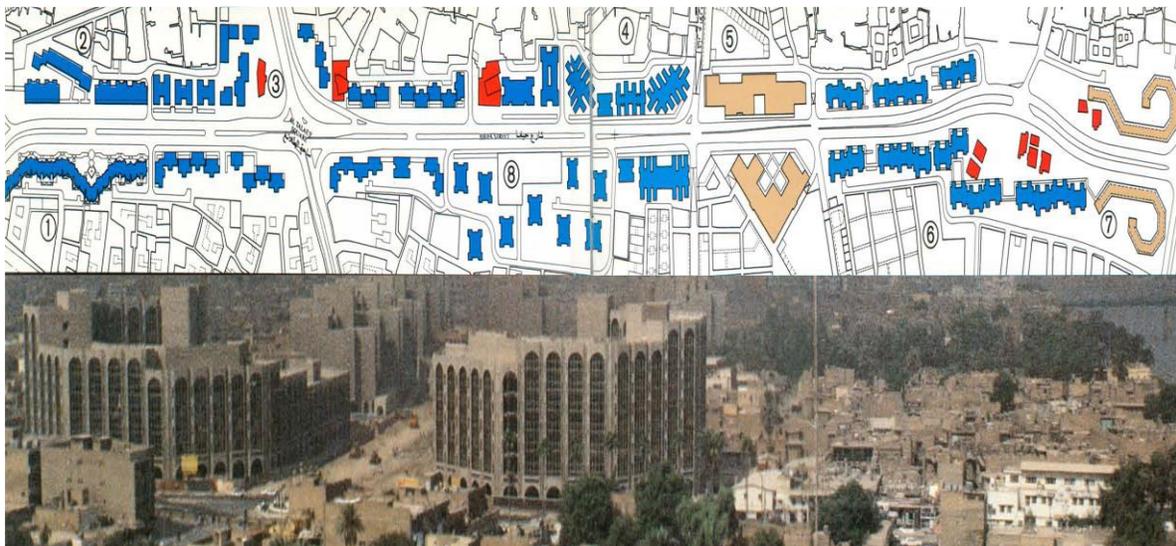


Figure (1-H) Relation of Haifa Street with the Old Fabric/ Al-Karkh Historic Center/ Source/ Al-Karkh Center Study – Secretariat



Figure (1-I) Al-Azhar Street at Cairo Historic Center – Source/ Cairo City Study/ Islamic Cities and Capitals Organization 1984

Table (2) Detailed terms of the main indicator of the visual integration/ Researcher

Main Indicators	Secondary terms	Detailed Terms	
Visual Level Visual Integration	Comprehensive Visual Integration	Node Physical Connection, Contextual Idea and their Visual Relations; Visual Succession; Sense of Place; Gradation; Urban Scene Shape	
		Organization of the Urban Scene Shape	Organizing the presentation of the constructional unit; organizing the constructional line; organizing the sky line
			Consistency of colors and contact; repetition; harmony; balance
		Visual connection among streets, open spaces and facades	
	Organic connection among the parts in the closed movement pattern; proportional relations of sizes; balance and rhythm		
	Topical Visual Integration	Clarity of nodes; high clarity of physical connection	
		Contextual theory and their visual relations.	
		Spatial containment of the relation between the length and the width of the space; longitude of the street; intersections; signs	
		The scope of vision and transparency; overlapping; scenes	
		Uniqueness of: external borders of the shape and contradiction with the background	
Visual gradation of masses and spaces; forms; measure and size; density			

Table (3) Detailed Terms of the Main Indicator of Compositional Integration

Main Indicators	Secondary Terms	Detailed Terms
Compositional Level Compositional Integration	Comprehensive Compositional Integration	Clarity of the Urban Structure: Recognizing the comprehensive structure through topical characteristics.
		Centrality of the Urban Structure: of the compositional characteristics and social events.
		Spatiality of the Urban Structure: in the extension of the pedestrians movement and their daily events among the parts of the urban structure.
		Clarity of the Movement Direction: the existence of a clear beginning and end.
		Regularity - analogy
	Topical Compositional Integration	Altitude of the urban structure of inward opening and consistency of the urban structure
		Organization of the Urban Structure: Integration of masses and spaces
		Consistency among compositional topical parts.
		Penetration among the parts: continuity of visual and movement axes among the parts
		Spatial gradation: privacy (events), spatial volumes, openness and closure
Variety of topical characteristics		

Table (4) Detailed Terms of the Main Indicator of the Concepts of Transformation

Main Indicators	Secondary Terms	Detailed Terms
Urban integration at the level of concepts of transformation in the urban structure	Comprehensive Concepts	Volumetric modulation of the old urban fabric cells as a volumetric indicator for the new building
		The use of flexible dynamic urban network to link the old fabric to the new.
		Integration of contradictions: compiling contradictions in a central space (attracting central space)
		Reweaving the old urban fabric (extension of axes and spaces)
	Topical Concepts	Fundamental compositional principle of the architectural and urban patterns (the use of pattern)
		Re-urbanization: Continuity of the urban fabric (relation between the sign and the fabric) and (reweaving to the urban scene).

Table (5) Values of Central Axes Rates/ Urban Structure of the Second Stage 2008

	Conne ctivity	Altitude Comprehensive Option	Topical Integration	Centrality Comprehensive Integration	Clarity	Spatiality
Haifa Street	20	6.81234	2.11201	4.13340	0.59	0.56
Sheikh Marouf St.	20	7.89286	1.25505	5.43891		

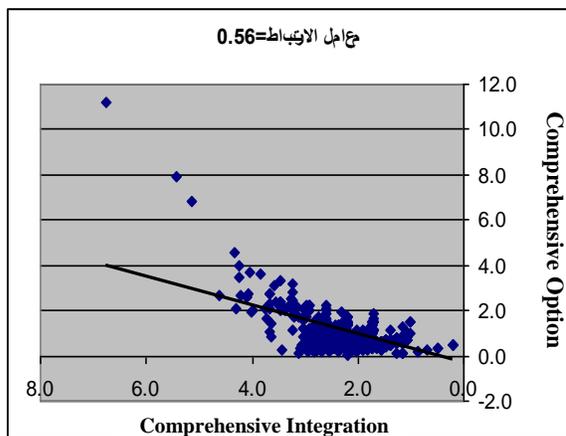
Musa Al-Kazem St.	28	11.17619	1.51308	6.74902		
The Museum Street	11	2.63258	1.80385	4.22140		
Al-Talai Street	10	2.61111	1.81597	4.09541		
	12	3.47821	1.58524	4.24460		
Al-Nasser Street	14	2.65355	1.87128	4.62689		

Table (6) Values of the Central Axes Rates / Urban Structure of the third stage

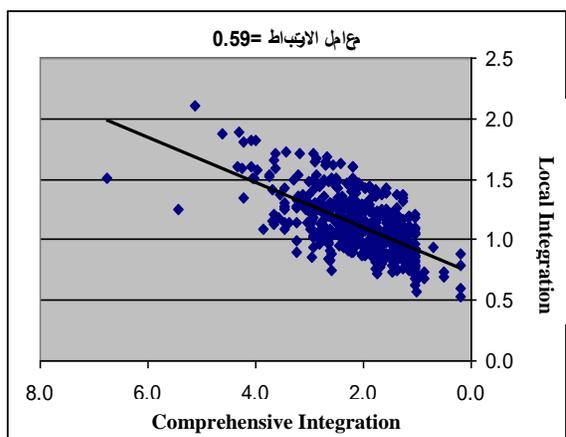
	Connectivity	Altitude Comprehensive Option	Topical Integration	Centrality Comprehensive Integration	Clarity	Spatiality
Haifa Street	63	13.74222	2.94340	7.55679	0.81	0.49
Sheikh Marouf St.	11	2.57738	1.71244	4.05769		
Musa Al-Kazem St.	28	11.04762	1.79715	6.27489		
The Museum Street	13	2.79318	2.25598	4.79019		
Al-Talai Street	17	2.92930	2.32002	5.01561		
	12	3.43703	1.89829	4.30393		
Al-Nasser Street	21	3.00214	2.28264	5.34509		

Table (7) Values of the Central Axes Rates/ Urban Structure of the Fourth Stage

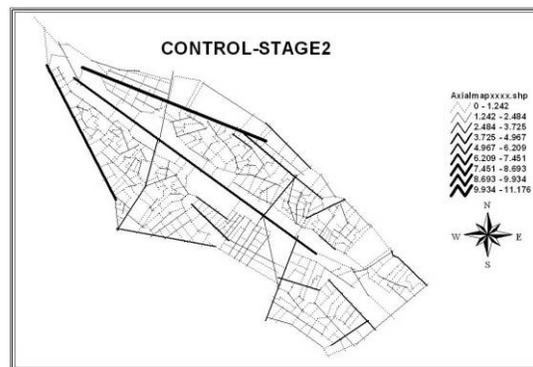
	Connectivity	Altitude Comprehensive Option	Topical Integration	Centrality Comprehensive Integration	Clarity	Spatiality
Haifa Street	39	14.42702	2.50023	6.58444	0.70	0.57
Sheikh Marouf St.	20	7.72619	1.32818	5.40613		
Musa Al-Kazem St.	29	11.09286	1.67584	6.64805		
The Museum Street	11	2.62488	2.01613	4.45316		
Al-Talai Street	9	2.13675	2.03165			
	12	3.48932	1.72479			
Al-Nasser Street	12					



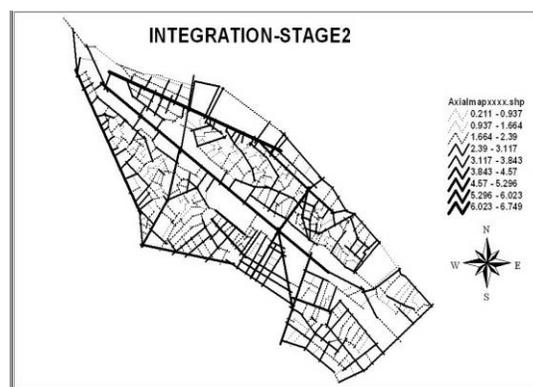
Spatiality of the Urban Structure Indicator/ 2nd stage



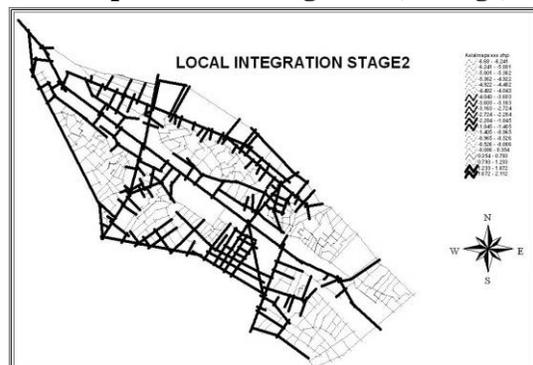
Clarity of the Urban Structure-2nd stage



Comprehensive Option(2nd stage)

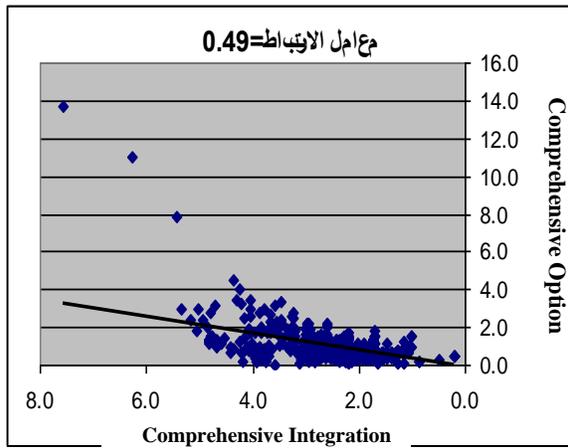


Comprehensive Integration(2nd stage)

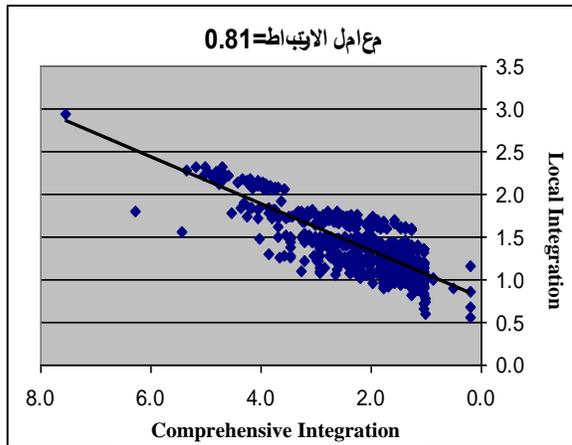


Local Integration(2nd stage)

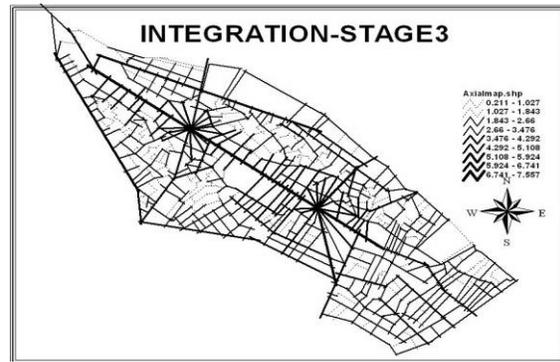
Figure (5)
Indicators of the 2nd Stage Rates



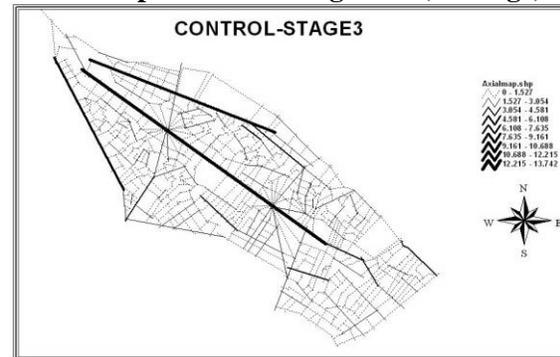
Spatiality of the Urban Structure Indicator/ 3rd stage



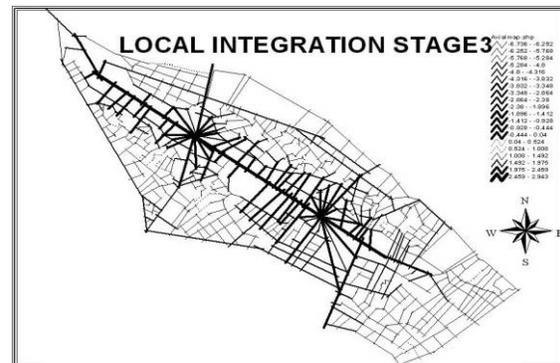
Clarity of the Urban Structure-3rd stage



Comprehensive Integration(3rd stage)

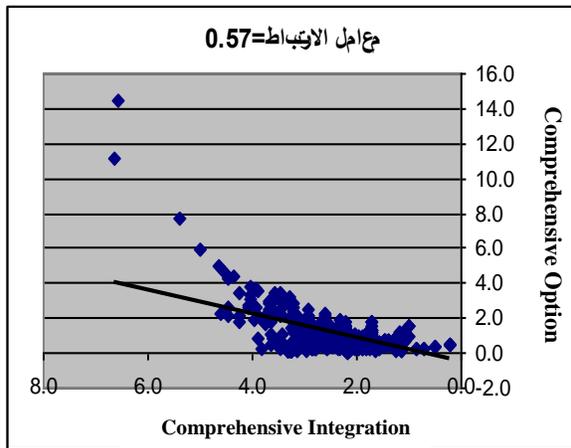


Comprehensive Option(3rd stage)

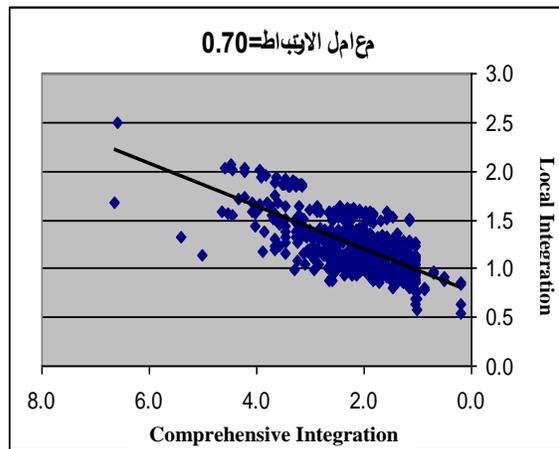


Local Integration(3rd stage)

Figure (6)
Indicators of the 3rd Stage Rates

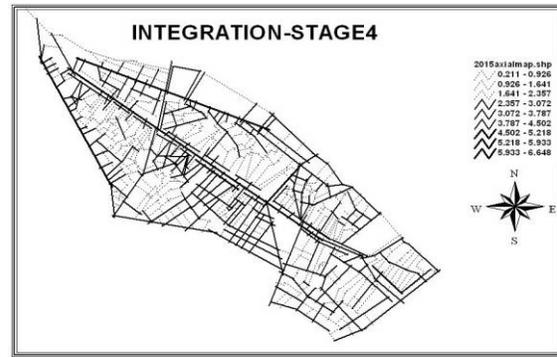


Spatiality of the Urban Structure Indicator/ 4th stage

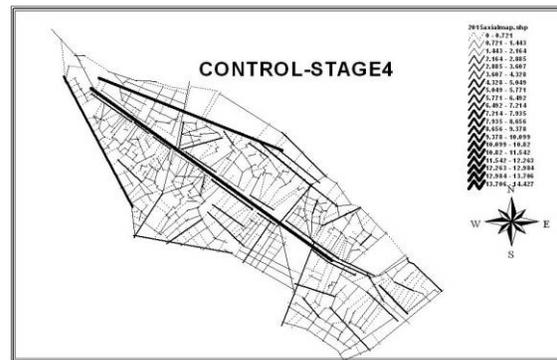


Clarity of the Urban Structure-4th stage

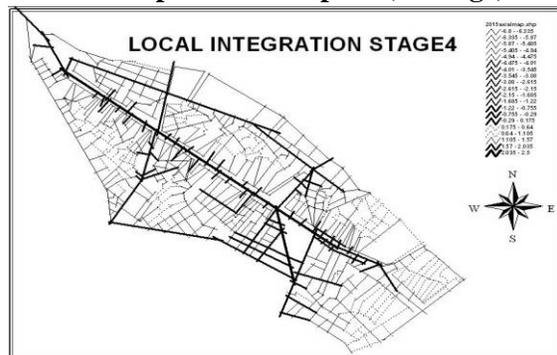
Figure (7)
Indicators of the 4th Stage Rates



Comprehensive Integration(4th stage)



Comprehensive Option(4th stage)



Local Integration(4th stage)

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