



Historical Paths and the Growth of Baghdad Old Center

Professor Dr. Sana Sati Abbas
Department of Architecture
University of Technology

Lecturer Dr. Sahar Hilal Abdulrida Al-Dujaili
Department of Architecture
University of Technology

sahar_aldujaili@yahoo.com

ABSTRACT:

Urban growth of cities is connected with three related problems, the first one, is the deterioration of the center, which is a mark for historical origin. The second is the emergence of city edge, which contradicts by the center. The third one is the rapid semi urbanism of the edge. Literature review showed that Baghdad historical center (Old Rusafa and Karkh) had grown in four morphological stages, during which main paths had been changed from those which were perpendicular to the river front to those parallel to it. Research problem is that "there is a knowledge gap about the direction and origin of paths within Baghdad old center, after its growth". The first research hypothesis is, "the direction of paths within old Baghdad center had been changed from those perpendicular to the river to parallel to it, then to a grid system by the effect of streets cut through and bridges constructions". The second research hypothesis is that, "New paths (streets) which had been cut through old center had an origin within the historical paths".

The research aims to verify from the change in paths direction within old center, also from the origin of new streets in relation with historical paths. Research found that some new streets within Old Rusafa and Karkh, which are parallel to the river, existed as historical paths, according to the integration genotype of this center within the four morphological stages.

Key words: Urban growth, Path, old Rusafa, old Karkh, Morphology

المسارات التاريخية ونمو مركز بغداد القديم

د. سحر هلال عبد الرضا الدجيلي
مدرس

د. سناء ساطع عباس
أستاذ

الخلاصة:

يرتبط النمو الحضري للمدن بثلاثة مشاكل، تتمثل المشكلة الأولى في تدهور المركز الذي يعتبر أحد علامات الأصل التاريخي. الثانية، تنشأ من حافة المدينة التي تتناقض مع المركز. الثالثة، النمو شبه الحضري المتسارع لحافات المدينة. أشارت الدراسات السابقة الى نمو مركز بغداد التاريخي (الرصافة والكرخ القديمة) في أربعة مراحل، تغيرت خلالها المسارات التاريخية من عمودية الى موازية للنهر. تحددت مشكلة البحث في "وجود فجوة عن اتجاه وأصل المسارات ضمن مركز بغداد القديم بعد النمو". تحددت فرضية البحث الأولى في "تغير اتجاه المسارات ضمن مركز بغداد القديم من عمودية الى موازية للنهر، ومن ثم الى النظام الشبكي، وذلك نتيجة لتأثير الشوارع الحديثة وإنشاء الجسور". أما فرضية البحث الثانية هي "المسارات (الشوارع) الجديدة التي مزقت المركز القديم أصولاً ضمن المسارات التاريخية".

يهدف البحث الى التحقق من التغير في اتجاه المسارات ضمن المركز القديم، كذلك من أصول الشوارع الجديدة بالعلاقة مع المسارات التاريخية". توصل البحث أن عدداً من الشوارع الجديدة ضمن الرصافة والكرخ القديمة، الموازية للنهر، موجودة ضمن المسارات التاريخية، وذلك بناءً على تكامل النمط الجيني للمركز التاريخي ضمن المراحل التاريخية الأربعة.
الكلمات الرئيسية: النمو الحضري، المسار، الرصافة القديمة، الكرخ القديمة، المورفولوجية

1- INTRODUCTION:

This paper studies the historical paths in Old Baghdad Center (Old Rusafa and Karkh) through its four morphological stages. The paper ascertain that there are historical paths parallel to the river in addition to Al-Kaelani origin– Al-Maidan, and Al-Maidan – Al –Mustansir streets, those paths are basic for the origin of new roads in Old Rusafa and Karkh. The research problem is that **“there is a knowledge gap about the direction and origin of paths within Baghdad old center, after its growth”**. The aim of this paper is to prove that. First research hypothesis as, “the direction of paths within old Baghdad center had been changed from those perpendicular to the river to parallel to it, then to a grid system by the effect of streets cut through and bridges constructions”. And the second research hypothesis can be stated as, “New paths (streets) which had been cut through old center had an origin within the historical paths”.

So the research methodology will be:

- Meaning of urban growth and path.
- Theoretical study to Old Baghdad Center, and its paths.
- Analytical study of Old Rusafa and Karkh using geographical information system.
- Findings, conclusions and recommendations.

2- URBAN GROWTH:

Growth means increase over time. This increase may be physical or abstract, so the system will be more complicated

([www.wikipedia.org/wiki.Growth/html](http://www.wikipedia.org/wiki/Growth/html)).

Urban growth means physical expansion. This means spatial and functional changes, and transformation from unbuilt area to urban area. This later means changes in land use, so activities and spaces are basic elements to a system known as urban growth (Cheng). As a result urban growth has an implicit meaning, known as urban sprawl. The dynamics of urban growth of a city starts from the continuity of urban sprawl, to change the vacant land to urban land, for the purpose of development (Batty).

Urban growth of cities is connected with three problems related together. The first one, is the deterioration of the center, which is a mark for historical origin. The second is the emergence of city edge, which contradicts by the center. The third problem is the rapid semi urbanism of the edge (Batty).

Rapid growth means constant turmoil, facilities which are ill fitted to demand, and institutions whose capabilities constantly lag behind the need for them (Lynch, 1982). Generally, the growth in size of a place or a change in its function can often be too rapid for successful agreement and adaptation of the vitality and fit. While growth was once applauded, and still is in economics, we have recently come to see dangers in it, and some argue for “zero growth”, just as Plato did, but it is hard to maintain the absolute stability. Zero growth is potential of



decline and deterioration. Rapid decline (like rapid growth) may be a catastrophe. Therefore, in certain general situations, there might be optimal rates of growth or decline (Lynch, 1982).

The concept of an optimum rate of change is as elusive as optimum size itself. The “goodness” of a change may depend more on its form than on its quantitative rate: was it an abrupt leap succeeded by recession, a wild oscillation, a continued unending expansion, or an s-curve of growth from one phase to another Repeated oscillation, for example, may give rise to standard difficulties. Or the form and extent of the change must be considered together. Yet even the effect of simple rate on our dimensions is still to be investigated. In general, the growth of the urban fabric and its decline, considered as the essential features of the urban form, and includes many effects and implications. They should not be sources of automatic satisfaction or alarm (fig. 1) (Lynch, 1982).

2-1 Types of Urban Growth:

The most difficulties in analysing urban growth pattern by typology include how to quantify and characterize urban growth category (Shi, et al., 2012). From the potential of typology. Forman (1995) divided urban growth into three types: infilling, edge-expansion, and outlying, other patterns of urban growth can be regarded as variants or hybrids of these three basic types. An infilling type refers to the one that the gap (or hole) between old patches or within an old patch

is filled with a newly developed urban patches (Liu, et al., 2010) (Fig. 2a). An edge-expansion, also called urban fringe development, refers to newly developed urban patches spreading out from the edge of existing urban patches (Xu et al., 2007) (Fig. 2b). If the newly grown patch is found isolated from the old, then it would be defined as an outlying type (Fig. 2c). (Liu, et al., 2010; Xu et al., 2007).

The pattern of urban growth described as a ‘diffusion-coalescence’ phase transition. An edge-expansion was the most common growth type, while the spontaneous growth took a greater proportion in area and patch number than the infilling growth at the early stage, but its dominance reduced as urbanization proceeded from the diffusion phase to the coalescence phase The geometric attributes as well as spatial distribution vary among the different growth types, and more importantly, development direction and speed may be different (Xu, et al. 2007).

3- OLD BAGHDAD CENTER (OLD RUSAFI AND KARKH):

3-1 Old Rusafa:

Khalifa Al-Mahdi came with his father Khalifa Al-Mansor to Baghdad in 151 AH (768 AD) and his army. Delegations came to visit him, for that Khalifa Al-Mansor ordered Al-Mahdi to camp on the east side of Baghdad, and building houses for himself and his soldiers. Due to that,

Rusafa was built near the tomb of Imam Abu Hanifa (who died in 150 AH) (Makkia, 2005).

Al-Mahdi put the first plan for the Mosque "Al-Masjed Al-Jamea", which was known later Masjed Al-Rusafa and Masjed Al-Mahdi. He built his palace beside the Mosque which was known later Rusafa Palace and Al-Mahdi Palace. Its construction was completed in 154 AH (Makkia, 2005).

Old Rusafa is the largest part of four historical areas in Baghdad City. With the demolition of Rusafa wall in (1869) by Midhat Pasha, the construction of a dam (1917), to protect Rusafa from flood, completing Rashid street in (1918), and founding connections between Rusafa and Karkh through (Shuhada bridge) in (1918), then Rusafa had expanded, and enter the modern stage (Amanat Al-Assima, 1984).

The Master Plan in (1936) proposed a construction of wide streets. They were, Al-Kifah street, Shikh Omar street in (1936), Al-Kholafa street in (1954), which was the reason for demolition of (32 ha). So Rusafa had been segregated to five longitudinal parts parallel to the river. This made Rusafa new longitudinal model parallel to the river (Amanat Al-Assima, 1984).

3-2 Old Karkh:

Al Karkh is an ancient village sited on the western side of Tigris River. In (157) AH, Khalifa Al-Mansor moved Suqs (markets) out of his round

city, because the city didn't have enough space for markets, and to protect buildings and walls of the city from smoke.

The growth of residents and merchants in Al-Karkh was rapid. The moving of Suqs out of the round city continued. The new place expanded and grew adjacent to the river Tigris (Makkia, 2005).

Al-Karkh was surrounded by a wall, and four gates (Fig.3, 4, 5). This fabric was torn the last decade of the twentieth century.

4- THE GREAT WALL OF OLD BAGHDAD:

4-1 The great wall on the eastern side of the city:

In 517 AH (1123 AD), Khalifa Al Mustarshid billah decided to build a wall on the eastern side of the Baghdad city. The wall had four gates; first one was (Al-Bab Al-A'la), which was known as "Bab Al-Sultan" and later known as "Bab Al-Muadham". The second one was, "Bab Al-Dhafaria" which was located next to Al-Dharafia neighbourhood east of Baghdad, later known as "Bab Al-Wastani". The Third gate was, "Bab Al-Halaba", later known as "Bab Al-Talasim". Lastly "Bab Al-Basalea", later known as "Bab Kelwatha" which was located next to Kelwatha village, close to the south of Baghdad, this gate known later as "Bab Al-Sharqi" (Makkia, 2005).



4-2 The wall on the western side of the city:

Suleiman Pasha, Wali of Baghdad, in his rule decided to establish a wall on the western side of Baghdad (Al-Karkh), between (1779 – 1802) AD.

Felix Jones and Kolenkood prepared a map for Baghdad. It illustrates the wall of the west side and its four gates, “Al-Kremat Gate” from the south, “Al-Hila Gate” and “Al-Shekh Maroof Gate” from the east, and “Al-Kadhmia Gate” from the north (Makkia, 2005). Felix Jones and Kolenkood estimated the length of the eastern side wall (10.600 yards) about (9688 meters), and the length of the western side wall (5.800) yards about (5300) meters (Makkia, 2005) (Fig. 3).

Mr. Rasheed Al-Khoja prepared another map for Baghdad in (1908) AD. It was congruent to map by Felix Jones and Kolenkood. It represented the latest map drawn during the Ottoman period. It shows Baghdad conditions before the British occupation.

This map showed that part of the western side wall was removed at that time. This map is considered as an important document in history of planning the city of Baghdad (Makkia, 2005) (Fig. 4).

Lastly, Mohamed Amen Zaki, was a Colonel in the Ottoman army. He prepared a map of Baghdad. This map was printed in the military press in 1338 AH (1919) AD. This map inverted from map of Rasheed Al Khoja.

The most important additions in this map was the “New Street” which opened at the end of Ottoman period in the eastern side of Baghdad (Al Rasheed Street) now, and the railway station in the western side, which was built by German. (Makkia, 2005) (Fig. 5).

5- BAGHDAD OF THE TWENTIETH CENTURY:

In the late nineteenth century and after Medhat Pasha became the Wali (or provincial governor) of Baghdad in (1869), Baghdad’s urban composition began to change and improve. The new Wali destroyed the city’s wall to build Al-Qushla building as the government and military center of the Ottoman Wilayah or province, but the old gates were spared for a while until three of them were destroyed later (Al-Silq, 2011).

The urban image of Baghdad with its compactness and traditional buildings, and some Islamic building styles which lasted for centuries, started to go through successive changes during the decades of the 20th century, commonly referred to as the 20th century architectural periods in Baghdad. But, there were certain basic moments of change in the urban and cultural structure. Some linked with the political changes, some with economic changes, and others linked with the social/demographic conditions, all causing the city to move in acceleration from one image to another (Al-Silq, 2008).

The first modern changes in the traditional urban fabric came with the opening of Al-Rasheed Street as the first modern street for automobile passage, which started in 1908 as Khalil Basha Jadasi (the street of Khalil Basha) after the Ottoman governor. Then, upon occupation by the British, it took the name of “New Street”, which was finally changed to “Al-Rasheed Street” for decades. It became the center of commercial life in the city. This street passing through some of the traditional markets, like Suq Al-Thulatha (Bab Al-Agha market) beside the old markets, which grew around Dar Al-Khilafa. The buildings on Al-Rasheed Street were mainly built in (30s and 40s) of the twentieth century having unique style which gave the street a distinguished character (Al-Silq, 2008).

Over centuries, the eastern part of Baghdad remained inside the wall. The western part of Baghdad including areas such as Sheikh Bashar and Sheikh Sandal and had visible walls in the seventeenth century, which were destroyed later (Al-Silq, 2011).

6- MORPHOLOGICAL STAGES OF BAGHDAD:

- **First morphological stage:** This stage presents the early phase of the emergence of Baghdad until (1853-1854 AD). It includes construction of Kalipha Palace, main market, some neighborhoods, the old wall and its gates in eastern side (Al-Rusafa), and includes construction of suq and the growth of residents

and merchants in western side (Al-Karkh), where the city was surrounded by wall, and its gates for both Old Rusafa and Karkh (Fig. 3).

- **Second morphological stage:** This stage presents the growth and urban expansion of old urban fabric until the beginning of twentieth century (1908 AD) where part of the wall had been demolished (Fig. 4).
- **Third morphological stage:** This stage presents Baghdad until (1950 AD). It shows the continued growth and urban expansion of Baghdad, in addition to construction of new roads through traditional urban fabric, which are parallel and vertical to the river and linking both sides of the city, Al-Rusafa and Al-Karkh, by number of modern bridges. Therefore, this period represents the beginning of the influence by Western ideas, or so-called "Westernization" (Fig. 6).
- **Fourth morphological stage:** This stage represents current situation. It shows increase of demolition area in traditional fabric and expansion of modern construction based on grid system, construction of Haifa Street within Al-Karkh, and the construction of Bab Al-Moadham Bridge to connect Rusafa and Karkh (Fig. 7).

7- PATHS:

Paths are the channels along which the observer customarily, occasionally or potentially moves. They may be streets, walkways, transit



lines, canals, railroads. For many people, these are the predominant elements in their image. People observe the city while moving through it, and along these paths the other visual environmental elements are arranged and related (Lynch, 1960). Each path has its own character. It fits into the cultural and natural landscape in its own way and reveals its own sequence of views (Lynch, 1984).

Linkage theory derives its content from the relation between the lines and paths which relates the components together. Paths include streets, pedestrian passages, open linear spaces or any component linking parts of the city visually and physically (Trancik, 1986).

Linkage theory tries to find the system in network links to create a structure to organize spaces. It focuses on path of movement instead of spatial scheme. This theory considers systems of movement have priority on layout of landscape, for that the dynamic of movement is the basic to create urban form. It provides one path or several paths to organize and connect spatial data, which can be presented by lines and edges of site, direction flow of movement, organizational path, or edge of the building imposing itself to be considered by urban designer.

Fumihiko Maki indicated that linkage has important quality in urban space, and thought that there are three types of formal urban space based on linkage concept in their formation. These types are (Trancik, 1986):

7-1 Formative type– composition form:

This type is composed of individual buildings arranged together on the surface of a two-dimensional, and, clustered together on foundations of conventional configuration. In this type spatial coherence is embedded more than declared. Configuration elements are often stable and formal in shape. Visual paths are obvious and dominant on the quality of division sectors, kept every part of its independence, similar to functionalist pattern, which represents one of the modalities of formative type (Trancik, 1986).

7-2 Mega type– mega form:

Components of this type overlap together within hierarchical structure or framework within open ended system, and associative relation is intercalated on the general urban form (Trancik, 1986). These types are characterized by their influence on the urban and natural environment through the following:

- Cause an obvious and essential change in natural environment by using dominant urban form on the parts.
- Using a high degree of superposition and overlap among activities and functions without concern for their formal independence. Total final form is dominant.
- Mostly, existence of two types of economic investments versus one form, public and private investment.

- Using advanced technology in the implementation, maintenance and perpetuation.
- Associative relation is super imposed within total form of urban form.

7-3 Group form:

This type is generated from a pool of independent parts are often similar. Associative relation arise and growing gradually as a part interconnected and nested within generative and organic environments, around a fundamental axis from a general open space. This type reflects the social relationship for structure of existing society. Urban form of this type characterized by its gradual ramifications and extension of its lines and paths movement as gradual arteries within the parts, which grow and expand by adding other parts to them. This type reflects its harmony with organic type .Most of traditional urban areas grew up in this type.

The organization of space and how places are related is, therefore, important since they reflect and reinforce orbits and networks. Such social spaces consist of places and paths rather than surfaces (Rapoport, 1977).

Hillier emphasizes, in functional terms, all interfaces between building and public spaces, between localized and less localized movement, between inhabitant and stranger. Of course life is possible in such a place, but there is now evidence to suggest that we ought to be pessimistic. Efforts to trace the path that such designs can have over a

long period on the type of life that goes on in them suggest that there is a pattern of long-term development in which then attract anti-social uses and behaviours (Hillier, 1996).

8- HISTORICAL PATHS IN OLD BAGHDAD CITY;

Literature review mention that there were five historical paths within Old Rusafa represent the vital roads for pedestrian movement within the old city, those paths are (Amanat Al-Assima, 1984) (Fig. 8a):

- 1- Al-Bab Al-Wastani/Al-Qalaa, its lengths (2000) m.
- 2- Al-Bab Al-Wastani/Al-Aswaq, its lengths (1200) m.
- 3- Bab Al-Telism /Al-Sinak , its lengths (1600) m.
- 4- Al-Kaelani / Al-Maidan, its lengths (2500) m.
- 5- Al-Maidan / Al-Mustansir street, its lengths (1700) m.

Also showed historical paths within old Karkh which connect the city with its main gates, named as (Bab Al-Kadumain, Bab Al- Shikh Maarouf, Bab Al- Hilla, and Bab Al-Kremat) (Fig. 8b).

9- MEASUREMENT:

The research used the geographical information system, and (Arc view GIS 3.3 – Extension Ax-woman) software to discover the integration genotype of Old Rusafa and Karkh



within their four morphological stages mentioned before, where genotype means, the basic generator which produces different special urban shapes (phenotypes). In language, it is the opposition to the deep structure (Hillier, 1996), also it means the social logic behind the configuration of urban settlements (Hillier, 1986-1987). Hillier mention that there are four main integrated genotypes (Hillier, 1983):

- Globally integrated core, where the most integrated spaces connect the center to the outside, forming a wheel-like pattern. The most segregated spaces form clusters which are at the interstices of the wheel (Fig. 9-a)
- Urban area where the most integrated spaces distributed around the edges and do not penetrate to the areas geometrical heart. Conversely the most segregated spaces form an inaccessible core at the center (Fig. 9-b).
- Area where the integrated core is tightly wrapped around the center, creating an inward – looking integrated heart, which is accessible from outside, The segregated spaces form a band around the edge of the area (Fig. 9-c).
- An area which has an integrated core that forms a tree-like pattern across the town – thus linking the center to the outside - but leaving two large zones of inaccessible segregated spaces on either side of the integrated core (Fig. 9-d).

10- PRACTICAL STUDY:

The practical study is a morphological analysis of Old Rusafa and Karkh within their four morphological stages mentioned before. The aim of this analysis is to discover the integrated genotype, and whether there is an origin of additional historical paths parallel or perpendicular to the river in Old Rusafa and Karkh, which are the origin of new streets cut through Old Rusafa and Karkh.

11-FINDINGS:

11-1 Old Rusafa:

11-1-1 The first morphological stage (1853-1854) - (Fig. 10a):

- Results showed that in addition to the five historical paths (Al-Bab Al-Wastani /Al-Qalaa, Al-Bab Al-Wastani / Al-Aswaq, Bab Al-Telism /Al-Sinak, Al-Kaelani / Al-Maidn and Al-Maidan / Al-Mustansir), there were integrated paths parallel to the river, these paths were the origin for new streets (paths) which had been cut through Old Rusafa, within its third morphological stage, and called latter on (Al-Rashid and Shikh Omar streets), there integration values are (0.946), (0.667) in sequence.
- The genotype of this morphological stage is a tree-linked pattern and **perpendicular to the river**.

11-1-2 The second morphological stage (1908) - (Fig. 10b):

- In this stage the historical paths from Bab Al-Wastani which were perpendicular to the river had the most integrated values (1.003), (0.990), (0.954) in sequence.
- Path represented the origin of Al-Rasheed Street had the highest integrated value (1.01).
- There exists an axis perpendicular to the river, which represented, Al-Shuhada bridge. Its integration value was (1.032). It is the same historical path (Al-Bab Al-Wastani / Al-Aswaq).
- The genotype within this morphological stage is a tree-linked pattern and **perpendicular to the river**.

11-1-3 The third morphological stage (1950) - (Fig. 10c):

- In this stage, one historical path perpendicular to the river from Bab Al-Wastani, remain as an integrated axis with value about (1.0281).
- New integrated paths parallel to the river had appeared. Those are Al-Kifah Street (1.476), Al-Rashid Street (1.0998), with new axis perpendicular to the river. Those axes connected Old Rusafa with Old Karkh across the river. It is Al-ahrare Bridge (1.465), in addition to Al- Shuhada Bridge (1.259).

- Shikh Omar Street had an origin within the old center. It is part of the path which connects Bab Al-Wastani with Bab Kulwatha.
- The genotype within this stage became tree-linked pattern, and **parallel to the river**.

11-1-4 The fourth morphological stage (1970 up till now) - (Fig. 10d):

- Result showed that the path from Bab Al-Wastani became weak.
- The integrated axis parallel to the river are Al-Rashid Street (3.72), Al-Kifah Street (3.15), Al- Khulafa Street (4.28) and Shikh Omar Street (3.79).
- New axis **perpendicular to the river** are those connected Rusafa with Karkh across bridges, those are Bab Al-Muadam (4.47), Al- Sinak bridges (3.923), and Al-Jumhuriya (4.578) in addition to Al-Shuhada (3.509), Al-Ahrar bridges (4.06),
- The genotype within this stage is a tree-linked pattern and had a **grid system**, as a result of streets cut through old fabric parallel to the river and the connection between Rusafa and Karkh by bridges which are perpendicular to the river.

11-2 Old Karkh:

11-2-1 The first morphological stage (1853-1854) - (Fig. 11a):

- Result showed that the origin of Haifa Street, which cuts through the fourth morphological



stage, was found as a segregated path, with an integration value (2.611). It is the same path that connects, the area with Bab Al-Kadimain.

- There was an integrated path perpendicular to the river, which connect Old Karkh with Old Rusafa, across the river, which is known latter on as Al-Shuhada Bridge with an integrated value (0.8104).
- The genotype of this morphological stage is tightly wrapped around a center.

11-2-2 The second morphological stage (1908) - (Fig. 11b):

- The origin of what was known latter on as Haifa Street was found in this stage as integrated path with integration value (0.752-0.922). It is a path parallel to the river.
- The genotype of this stage is a tree-linked pattern and parallel to the river.

11-2-3 The third morphological stage (1950) - (Fig. 11c):

- Results showed that the connection between old Rusafa and Karkh across Al-Shuhada Bridge had more integrated value (1.784).
- New connection was found at this stage. It is Al-ahrar Bridge with integration value (0.199).
- The genotype of this stage is tightly wrapped around a center.

11-2-4 The fourth morphological stage (1982 up till now) - (Fig. 11d):

- Result showed that Haifa Street had the highest integrated value (2.857), and was parallel to the river.
- Bab Al-Moadham Bridge is a new path perpendicular to the river connecting Rusafa and Karkh with integration value (2.11), in addition to Al-Shuhada Bridge with integration value (1.215), and Al-ahrar Bridge (1.494).
- The genotype of this stage is a tree-linked pattern and it is parallel to the river.

12-CONCLUSIONS:

12-1 General conclusions:

- 1- Growth of old Baghdad center was the reason for new streets which had cut through it. Litreture review showed that these new streets tore the existing fabric. This paper verifies that some of these new paths (streets) had an origin within this center.
- 2- The growth of old Rusafa was s-curve. While growth of old Karkh was a repeated oscillation, where the form and magnitude of change have been linked together.

12-2 Specific conclusions:

12-2-1 Old Rusafa:

- 1- Historical paths within Old Rusafa had been changed from that perpendicular to the river within the first and second morphological stages to parallel to it, within the third stage, to those parallel and perpendicular (grid system) within fourth morphological stages. So the research had verified its first hypothesis

regarding the origin of Al-Rashid Street in the first morphological stage was stronger than the second stage.

- 2-This paper verifies that the new streets in Old Rusafa, such as Al-Rashid and Shikh Omar Streets had their origins within the old traditional fabric.
- 3- Shikh Omar Street is part of the path which connects Bab Al-Wastani with Bab Kelwatha. So the research had verified its second hypothesis.
- 4- Paper showed that the historical paths from Bab Al-Telism / Al-Sinak, Al-Kaelani /Al-Maidan, and Al-Maidan / Al-Mustansir, are not active in comparison to those from Bab Al-Wastani/ Al-Qalaa and Al-Maidan /Al-Mustansir.
- 5- New paths had been formed within second, third and fourth morphological stages. They connected Rusafa with Karkh across the river, through Al-Ahrar, Al-Sinak, Al-Jumhuria and Bab Al-Moadam bridges in addition to Al-Shuhadaa bridge which was found in the first morphological stage. The paper considers them as new historical paths as they are constructed before (recent) years.
- 6- The integration genotypes of Old Rusafa was a tree-linked pattern within all morphological stages, but its direction was perpendicular to the river within the first and second morphological stages, changed to be parallel to the river within the third stage, and grid

system (parallel and perpendicular) to the river within the fourth stage.

12-2-2 Old Karkh:

- 1- Historical paths within Old Karkh had been changed from those parallel and perpendicular to the river within the first and third stages, to those parallel to it within the second and fourth morphological stage.
- 2-This paper verifies that the new streets in Old Karkh had their origin within the old traditional fabric, such as Haifa Street.
- 3- Main historical paths within Old Karkh are parallel and perpendicular to the river, connected old Karkh with surroundings across main gates.
- 4- New paths had been formed within third and fourth morphological stages. Those paths connected Karkh with Rusafa across the river, through Al- Ahrar and Bab Al-Moadham bridges, in addition to Al-Shuhada bridge which was founded during the first morphological stage.
- 5- The integration genotype of Old Al-Karkh had been changed from tightly wrapped around center within the first and third morphological stages to the tree-linked shape within the second and fourth morphological stages.

13- RECOMMENDATIONS:

- This paper recommends to consider these streets (paths) which had been cut through old



Baghdad center, as historical paths as they have been constructed before (50-100 years). Also to consider the paths that connected Rusafa and Karkh across the river, as historical paths for the same reason mentioned above, even though the bridges are more recent.

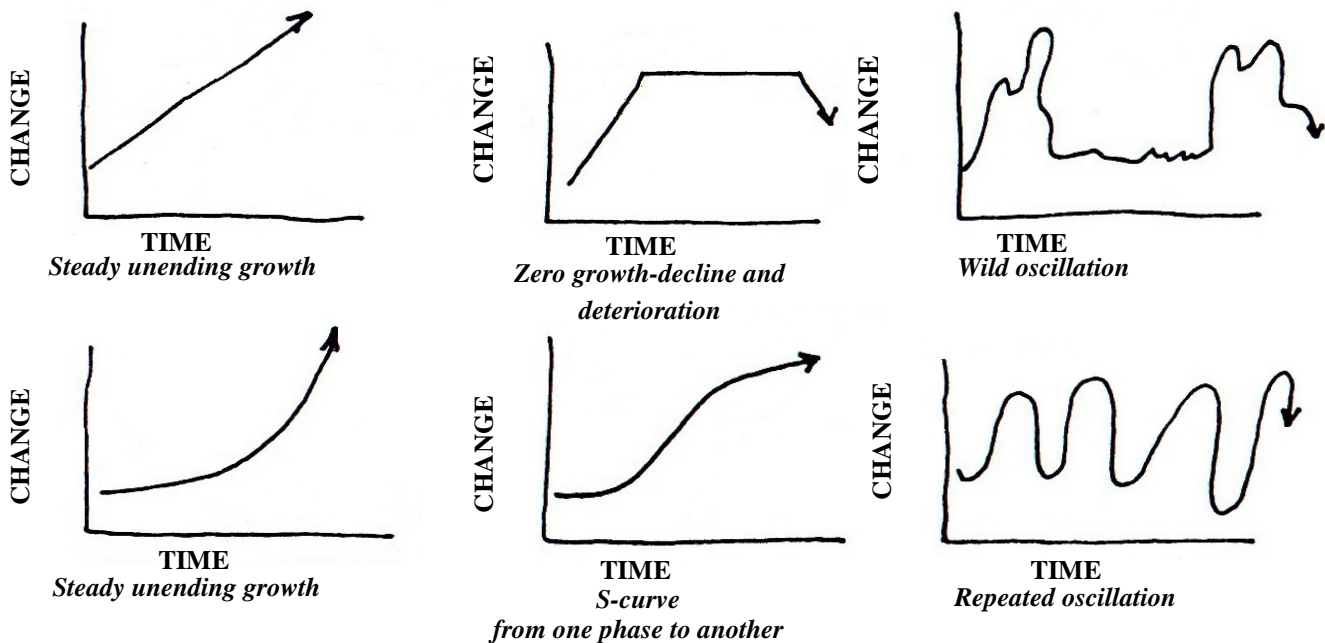
-This paper recommends re-connecting these streets (paths) with existing fabric and the river to revitalize the historical center.

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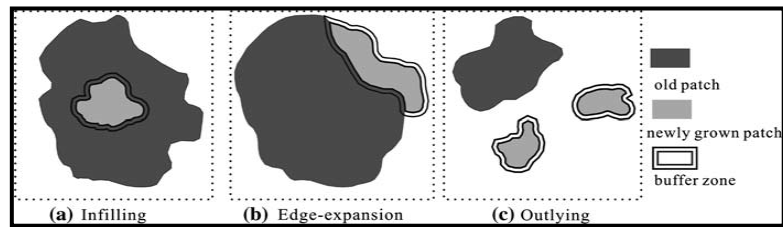
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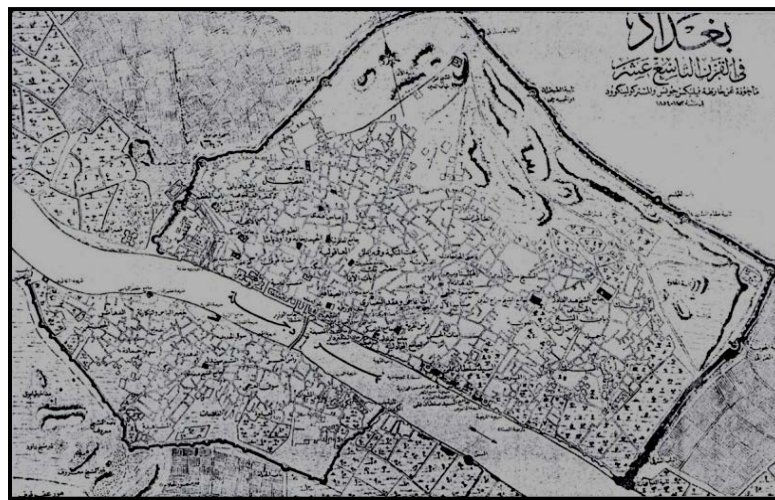


Internet websites:

(Fig. 1) Types of city growth
Source:(Lynch, 1982)



(Fig. 2) Three main types of urban growth
Source: (ivsl)(Liu, et al., 2010)



Figure(3)

A map of Baghdad prepared by Felix Jones and Kolenkood in (1853-1854) AD Source (Makkia,2005)



Figure (4)

A map of Baghdad prepared by Mr. Rasheed Al Khoja
in (1908) AD Source: (Makkia, 2005)

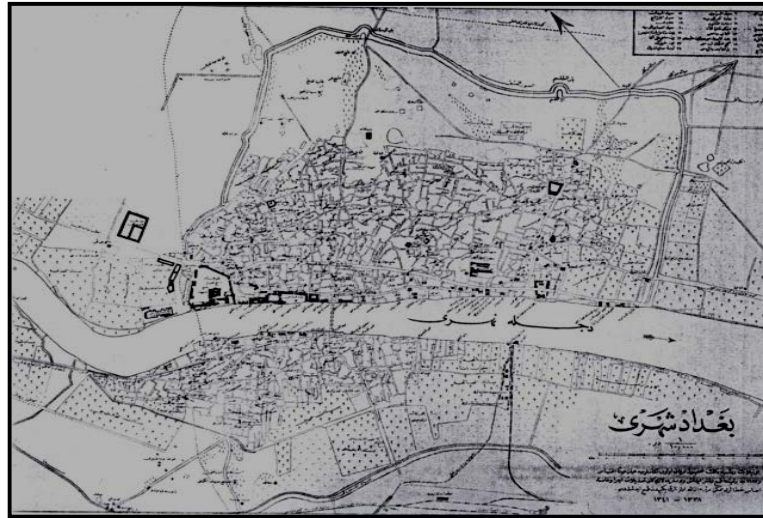


Figure (5)
A map of Baghdad prepared by Mohamed Amen Zaki
in (1919) AD Source: (Makkia, 2005)



Figure (6)
Baghdad in 1950 Source: (Susa, 1952)



Figure (7)
Current situation of Baghdad
Source: (Googleearth.com)

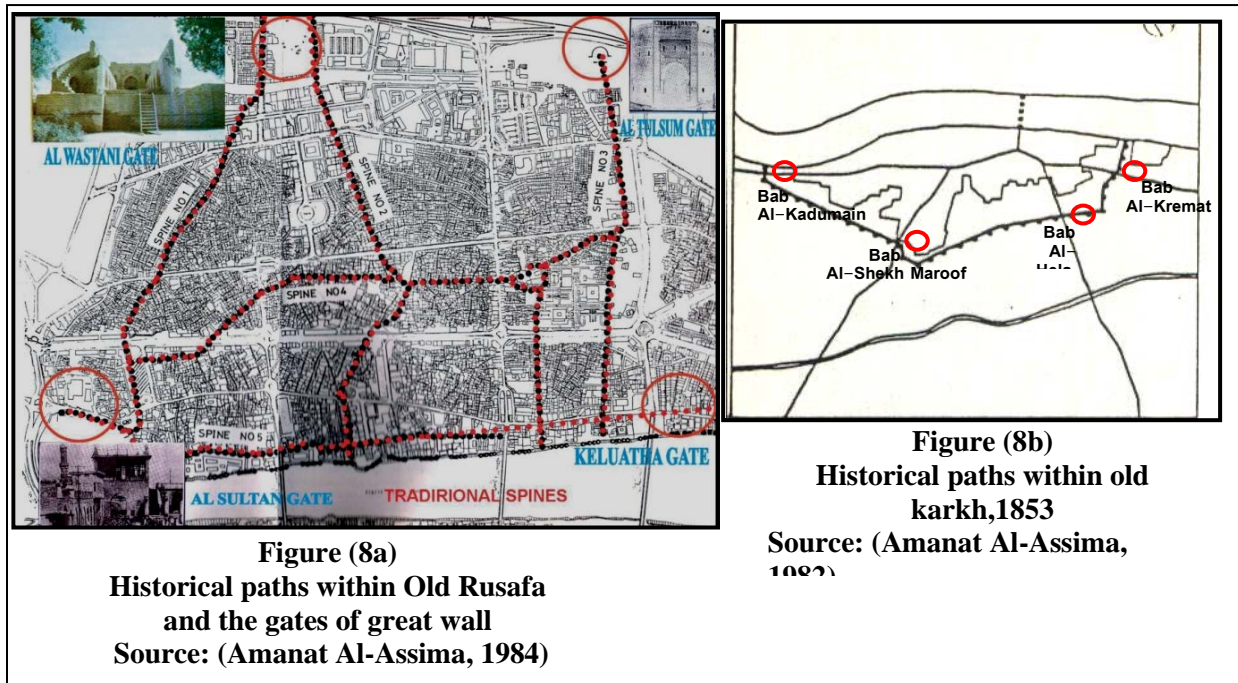


Figure (8a)
Historical paths within Old Rusafa and the gates of great wall
Source: (Amanat Al-Assima, 1984)

Figure (8b)
Historical paths within old karkh, 1853
Source: (Amanat Al-Assima, 1984)

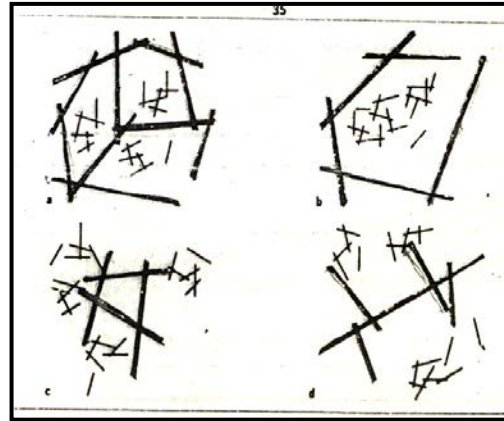


Figure (9)
Main integrated genotypes Source: (Hillier,

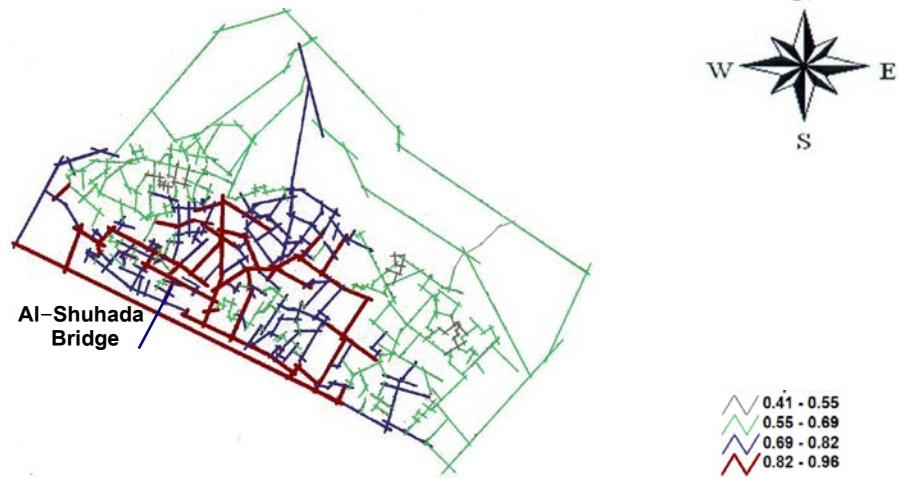


Figure (10-a)
First morphological stage of Al-Rusafa in (1853-1854)

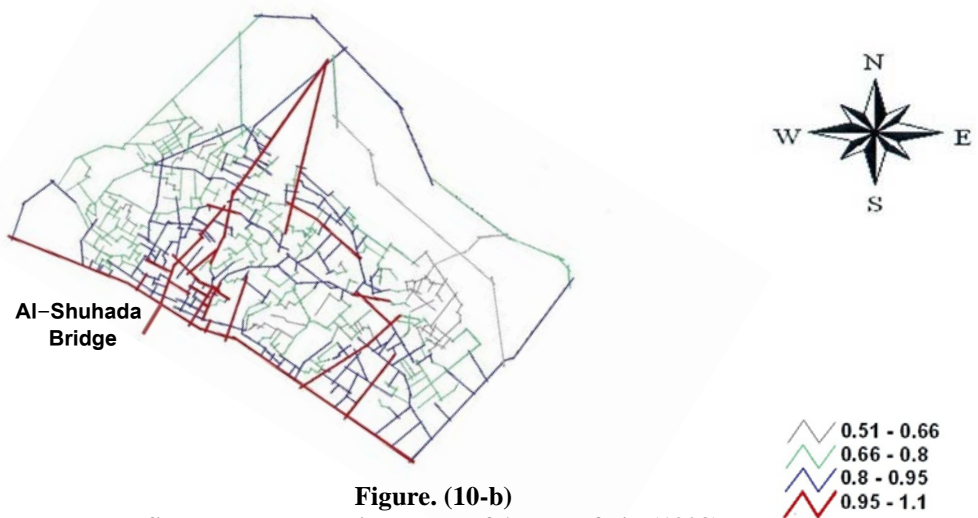


Figure. (10-b)
Second morphological stage of Al-Rusafa in (1908)



Figure (10-c)
Third morphological stage of Al-Rusafa in (1950)

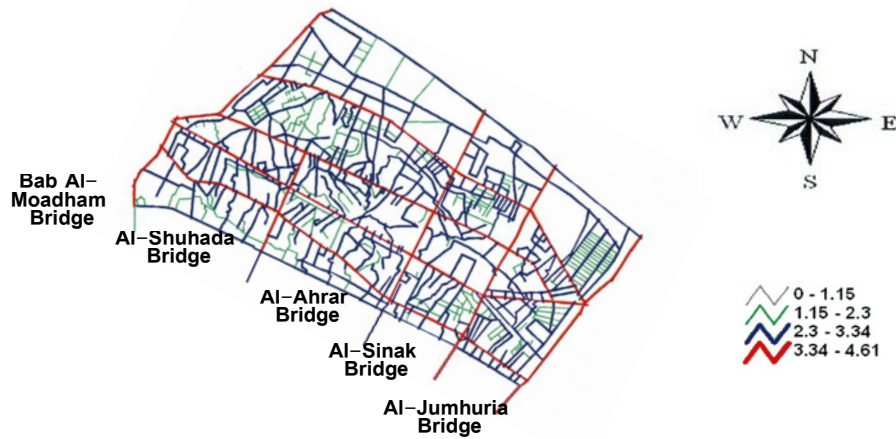


Figure (10-d)
Fourth morphological stage of Al-Rusafa in (1970 up till now)

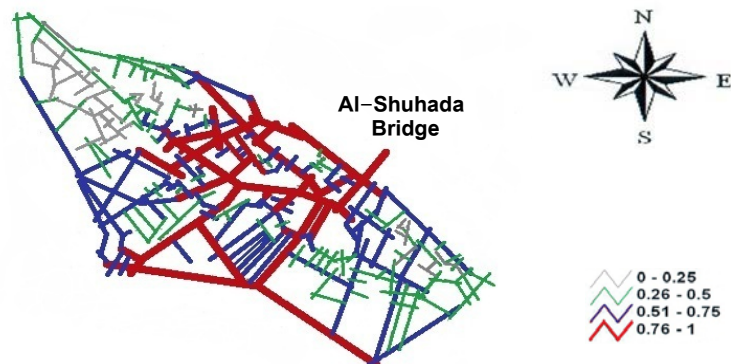


Figure (11-a)
First morphological stage of Al-Karkh in (1853-1854)

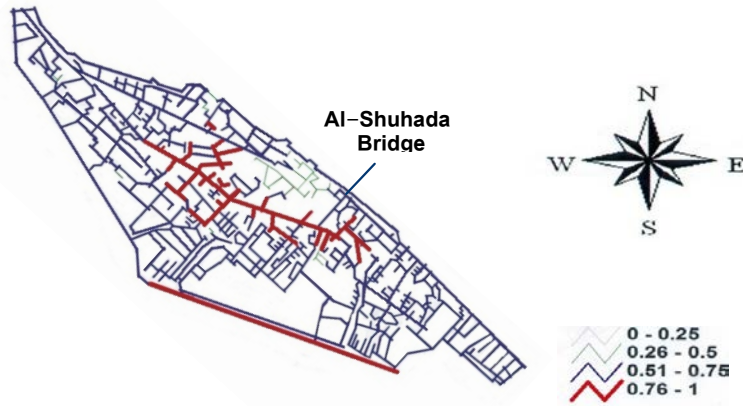


Figure (11-b)
Second morphological stage of Al-Karkh in (1908)

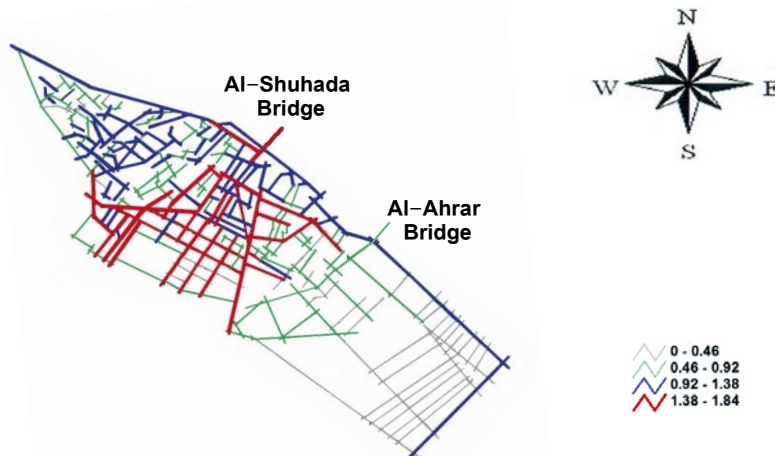


Figure (11-c)
Third morphological stage of Al-Karkh in (1950)

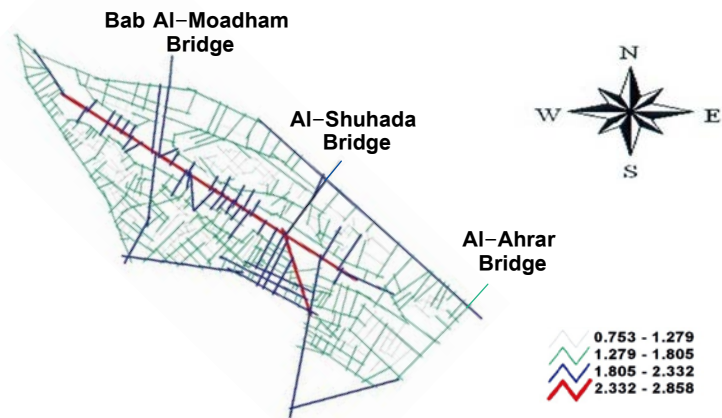
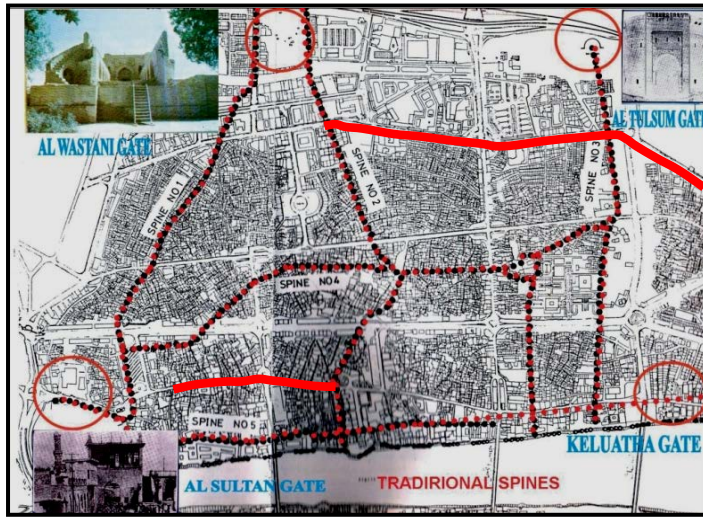
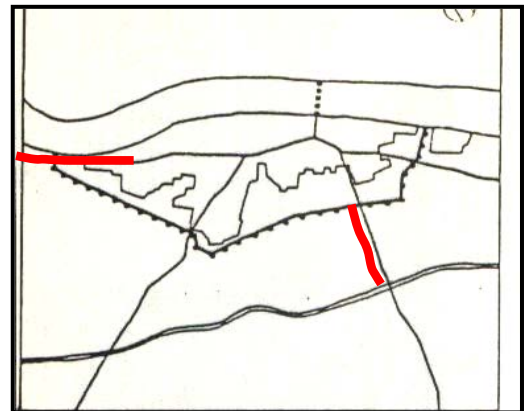


Figure (11-d)
Fourth morphological stage of Al-Karkh in (1970 up till now)



(Fig. 12a)

Historical paths within Old Rusafa
(source: Searchers)



(Fig. 12b)

Historical paths within Al-Karkh
(Source: Searchers)

Historical paths discovered
by previous literatures

Historical paths discovered
by search