



" Changes in the urban form of the city from the Abbasid era to the beginning of the twentieth century: a comparative study of the urban form (Baghdad as a model)

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Abstract

The research presents how various variables and factors interact and influence the urban form of the city over successive periods. Iraqi cities, like other cities, have witnessed numerous urban transformations due to the impact of several factors .One of the most prominent cities that embodied these changes is Baghdad, the current capital of Iraq, where the roots of its design and urban planning first emerged during the Abbasid period as a fortified circular city and a center of Islamic civilization, exemplifying power and authority.

The city subsequently faced a series of challenges and changes in rulers that affected its structural composition, leading to new transformations in its architectural structure influenced by the modernity of the twentieth century. The research concludes that the change in urban form was not limited to the influence of a single factor but interacted among many factors, primarily environmental, economic, cultural, political, and religious, which contributed to shaping urban structures throughout these periods, reflecting communities and their capacity for growth and adaptation. In the circular Baghdad, political and religious factors were the most influential in the changes occurring at the urban form level, introducing new patterns that were previously unfamiliar. The city of Baghdad in the period of late Ottoman era until the beginning of the twentieth century it did not match the previously known design and planning foundations and The most influential factors are the economic and political factors. in the city and the introduction of new jobs and random expansion, which affected the privacy of the city .

Keywords: Change Urban form , City of Baghdad, General shape, Nodes, Paths, Urban growth, Urban adaptation.

تغيرات الشكل الحضري للمدينة من العصر العباسي الى مطلع القرن العشرين :دراسة مقارنة للشكل الحضري (بغداد انموذجا)

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المستخلص

يستعرض البحث كيفية تفاعل وتأثير المتغيرات والعوامل المختلفة على الشكل الحضري للمدينة ولفترات متعاقبة ، حيث شهدت المدن العراقية شأنها من شأن المدن الأخرى العديد من التحولات الحضرية نتيجة تأثير عدة عوامل. من أبرز المدن التي جسدت هذه التغيرات هي مدينة بغداد عاصمة الدولة العراقية حالياً ، حيث امتدت الجذور التصميمية والتخطيطية الحضرية لها لأول مره في العهد العباسي كمدينة دائرية محصنة ومركز للحضارة الإسلامية وانموذجا يجسد السلطة والقوة ومررت بعدها المدينة بسلسلة من التحديات وتعاقب الحكام اثرت على بنيتها الشكلية وصولا الى التغيرات الجديدة بهيكلها العمراني بتأثير حدثاته القرن العشرين. توصل البحث بأن التغير في الشكل الحضري لم يقتصر على تأثير عامل واحد فقط بل تفاعل لعديد من العوامل أهمها البيئية ،اقتصادية ،ثقافية ،سياسية ،دينية مما دفع الى تشكيل الهياكل الحضرية عبر هذه الفترات وتجسيد المجتمعات وقدرتها على النمو والتكيف ففي بغداد المدورة كان العوامل السياسية والدينية هي العوامل الأكثر تأثيرا في التغيرات الحاصلة على مستوى الشكل الحضري وادراج أنماط جديدة لم تكن مألوفة ، أما مدينة بغداد في الفترة أواخر العهد العثماني وحتى مطلع القرن العشرين فأنها لم تطابق الأسس التصميمية والتخطيطية المعروفة سابقاً وأكثر العوامل تأثير هي العامل الاقتصادي والسياسي على التغيرات في المدينة وإدخال وظائف جديدة والتوسع العشوائي مما أثر على خصوصية المدينة.

الكلمات المفتاحية : تغير الشكل الحضري، الشكل العام، العقد، المسارات، الاحياء، النمو الحضري، التكيف الحضري .



1_Introduction:

Different factors and variables interact in each historical stage, leaving their mark on the urban form of cities, making them a mirror that embodies social, economic, political, and cultural changes. This study mainly focuses on Baghdad as a study case and reviews how multiple factors have influenced the city's changing structure and urban structure, highlighting the challenges Baghdad has faced during its various stages of development.

2_Literature Reviews On Urban Form :

2_1 Rossi, 1982, The Architecture of the City: The general concept of the city and architecture was presented and the statement of the impact of historical and cultural elements on the development of the urban form of the city, He also pointed to the importance of the economic structure in the transformation of the shape of the urban structure and did not address other factors such as politics or religion and sociology and the transformation in the urban form was measured through (space _ time). This is an indication that one of the ways to measure transformation is (space - time) and that one of the reasons for transformation is the economic factor.

2_2 AL_Badrani,Saba Ibrahim,2008. THE TRANSFORMATIONS OF ARCHITECTURAL IDENTITY IN THE URBAN ENVIRONMENT : ANALYTICAL STUDY FOR CULTURAL RESISTANCE MECHANISM IN COMMERCIAL STREETS FOR MOSUL CITYPhD , University of Technology: The study focused on the changes in the urban form resulting from transformations in the architectural identity by the influence of external thought and internal cultural reaction in Iraq, and the study adopted descriptive and analytical measurement methods through multiple approaches (cognitive, morphological, semiotics, structural) to understand these changes and transformations.





This is an indication that the cultural factor has an impact on the transformation and change of the urban form .

2_3 Hussein ,Mohammed Mahdi ,2016, esilience of City ,Published research,Journal of Engineering and Technology, Volume 34, Issue (A) :This study focused on the statement of the impact of the urban form on the flexibility of the city and its ability to respond to political influences (disturbances and crises) and nature (climate and its threats).This is an indication that the natural and political factor has an impact on the change of urban form.

2_4 Hamid, Faisal and others,2023, attrens of urban form and some social problems associated with it for multi-storey residential projects in Britain and the Arabian Gulf, Iraqi Journal of Architecture, Issue 22, 23, 24:The study focused on the analysis of patterns of urban form at the level of multi-storey residential projects in the Gulf cities with a statement of the impact of the social factor The research found that social problems are repeated in the projects of the Arabian Gulf, which indicates the relationship between each of the patterns of urban form and the emergence of these problems. This is another indicator that urban form is influenced by the social factor.

Most of the previous studies focused on analyzing the change in the urban form as a result of the influence of a specific factor or factors, and this was done within a specific time frame that does not exceed one or two consecutive periods and for different cities, which led to a limited comprehensive understanding of the transformations of the urban form and its overlap over time Here the need to study the change in the urban form linked between the multiplicity of influences and changes in wider time periods for a deeper understanding of the dynamics of the urban form and its changes in particular for the city of Baghd.





3_Research problem:

The lack of sufficient clarity of changes in the urban form and the reasons for this change and the factors affecting it of Baghdad and successive eras .

4_The Aim of the research:

Monitoring and knowing the change and demonstration in the urban form, conducting comparison, analysis and indication of the factors affecting change .

5_Research hypothesis:

There are several factors that made the urban form of the city of Baghdad change from one form to another over time, and the form of change is based on the strength and type of the influencer.

6_ Research Methodology:

The nature of our study in this research necessitates us to combine two approaches: the first is the descriptive historical approach to present and document the development of cities through successive eras, focusing on the changes that have occurred to them, and the second approach is the comparative analytical approach to study the difference and similarity between changes across different time periods in addition to analyzing the influencing factors.

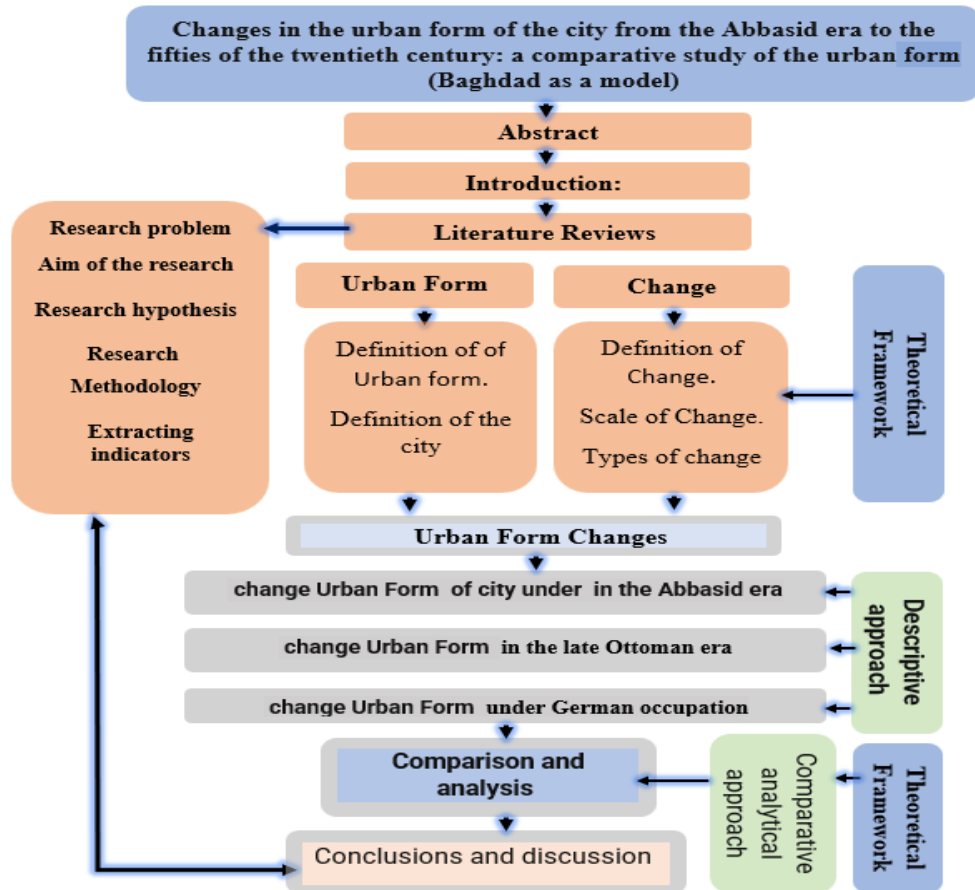


Figure (1) display the flowchart illustrating the proposed research structure and methodology. Source: Researcher.

7_Theoretical Framework

7_1 CHANGE: A word derived from the root verb ghayr (i.e. to change something, substitute it, or transform it from what it was (Louis Maalouf 1984, p. 563). Technically: changing from one characteristic to another, such as red to white.

Change: is the transition of a thing from one state to another that differs from its previous state. This transition is represented in changing the characteristics or status of the thing as a result of an action (removing, adding one or more elements).



This in turn leads to the emergence of new relationships between the previously existing elements, the new one or the ones causing the change. These elements can be material, moral, or both. (Jawad, 2011, p. 4).

In English, the word Change means: change (it is a process in which something becomes different, while transformation symbolizes a transition in nature or characteristics, and it is a fundamental change in condition or place. (Louis Maalouf, 1984, p. 158).

According to Kubler, change occurs in multiple ways. It may be a radical transformation that moves far away from the previous state or a slight modification of what existed previously (Jawad, 2011, p. 5).

Change includes concepts such as transformation and alteration, but change is more general because change means the transformation from one thing to another, i.e. from one state to another.

7_2 Scale of Change in Space (Urban and architectural):

7_2_1 The first scale is time and space:

Changes and time: In exploring transformations and changes, shows that time is an appropriate criterion for determining the nature of these changes. The type of change is affected by the influence of space and time, as partial transformations cause the shape to change and shift from the initial reference. reflecting the effect of time as a major determinant of transformations and changes and their impact on the shape. (Al-Imam, 2002, p. 15). (Rossi) indicates that change does not only occur through space, but also through time.



Time, according to Plotin is, like space and its relationships, it also has a strong and deep relationship with permanence because through its perception we can perceive the point or time of change and transformation (Jenzi, 2013, p. 17).

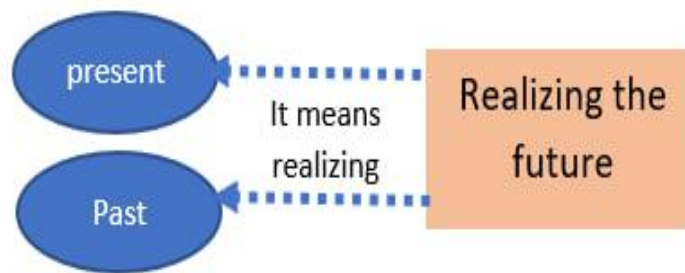


Figure (2) The relationship between perception and time. Source: Researcher.

Change, according to the time it takes to occur, it can be divided into two types:

The first is known as a sudden change: It means a rapid and radical upheaval resulting from a violent confrontation that is difficult to accept at the beginning first and is often the result of an intellectual upheaval or economic change.

The second is gradual: It takes a long time because it is part of the natural evolution of things, as is the case in the evolution of traditional architecture and its style before the twentieth century, where changes were slow and imperceptible in light of social, economic, and cultural stability. (Rappaport, 1984, p55)

7_2_2 The second scale, place:

Place is of two types: public and private, interaction with time takes place through movement, and time is perceived through space and forms a fourth dimension for it. (Al-Abbadi, 2023, p. 22)

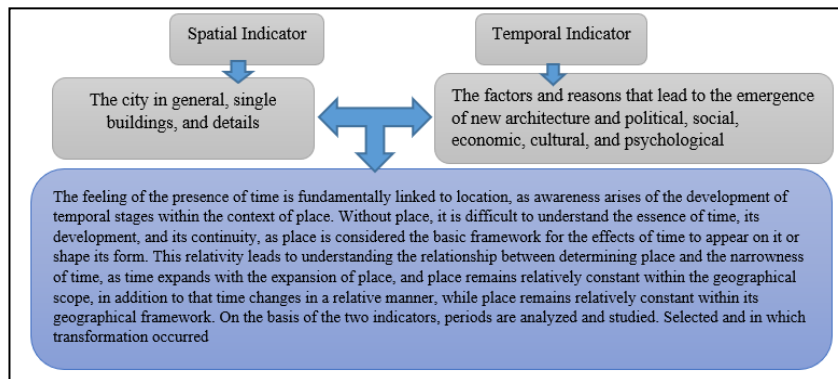


Figure (3) the relationship between time and space. Source: Researcher.

The relationship between time and space cannot be understood without movement, as economic, social and psychological variables affect architecture. As for space, it is affected by environmental and geographical factors that produce transformations that are reflected in social and cultural interactions, which shape the experience of time for society.

7 _2_3 Changes are divided according to the methods, approaches and goals by which the change is made in architecture and urban form into:

1. **conscious and planned transformations:** aimed at achieving a specific goal, and designs that are based on knowledge of causes and consequences are an example of this type of change. (mansour,1999,p366).
2. **Unintended change:** (The random): This is an unconscious and spontaneous change, i.e. the change that occurs innately and without intention or intervention. (Mahdi, 1989, p. 26).
3. **Accidental change:** These are changes that occur as a result of natural factors such as rain, earthquakes and winds, without intention to cause them and in an accidental manner.



There are three manifestations of change or transformation according to ANTONIADES: First, metaphor: This type of strategy gives new interpretations because it is a formal transformation, i.e. it is not related to the original, and it leads to gradual (slow) transformations, i.e. the transformations have a speed either slow or fast.

Second, traditional: In this strategy or formula, it gives predictable results, i.e. it affects the original in a small part and is affected by reasons that have been classified into external factors, meaning (climate, location, topography, cultural, social, political) and internal factors, which means those that are related to the building itself (function, formal characteristics, spatial organization ...)

Third, deconstruction: "The original is deconstructed into parts and work is done to find new ways to link these parts. As a result of this procedure, the system is transformed into a new one .(sana,2009,p49)

7_3 Changes at the urban form level (city)

Urban Form :The urban form embodies the interdependence between the requirements of daily life and the functions of the service city or is the result of the size of the settlements and their spatial structure.(Omran, 2016, p 189)

City:According to (Lynch) it is a set of general or individual images that overlap with each other and which in turn affect people's perception of the city and the formation of the mental image based on five basic elements (landmarks, nodes, neighborhoods, edges, paths). (Lynch.1960.pp47_48).

Trancik's correlation theory focuses on the relationship of space to mass through the analysis of distribution and proportions, explaining the organization of the city and the interaction of activities with urban space, where the interconnection depends on the location of buildings, the direction of movement, and their shape.(Ünal,2022,p353).

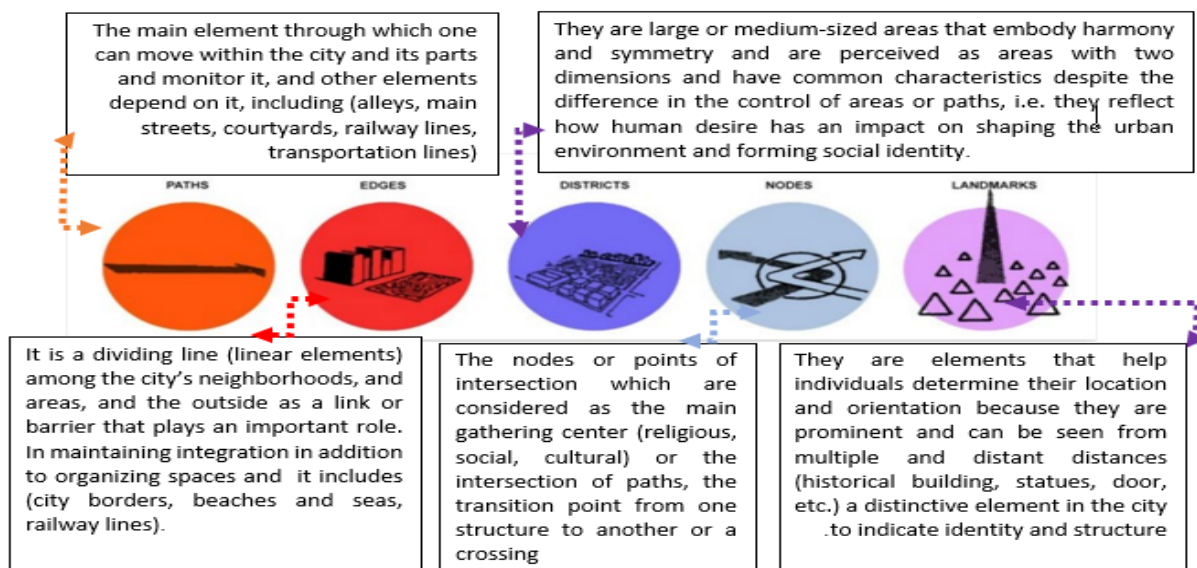


Figure (4) Components of the city according to Lynch. . Source: (Ünal,2022,p355 & Researcher)

7-4 Urban Form Change in the Baghdad city.

7_4_1 Urban Form under the Abbasid era:

The reason Al-Mansur chose the location of Baghdad west of the Tigris was for its fertility and moderate climate, in addition to being free of diseases and pests. That is, the Abbasids attached great importance to the geographical factor in the planning of their cities, so they chose sites that combine health and a mild climate, while avoiding sources of harm, which makes the location of Baghdad a conscious embodiment of that vision (Al-Samarrai, 2019, p. 394).

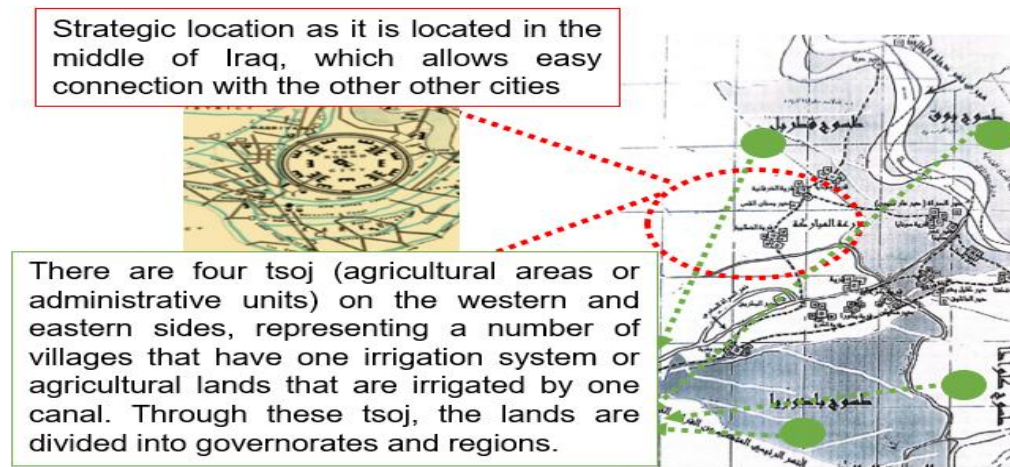


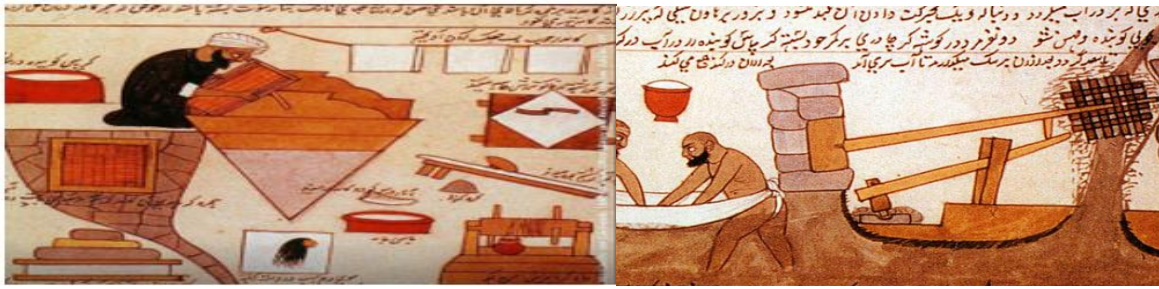
Figure (5) Baghdad site and natural fortification . Source: (wordpress, 2018).

We can say that Baghdad has a great economic importance as it forms an agricultural area on both sides of the river in a way that provides the necessary water and food (provisions) in addition to its distinguished strategic location.

Politically: Another influential factor is the Abbasids' quest to establish a capital subject to the Caliphate and occupy a central location. (Jawad, 1986, p.27) Instead of the areas in the north and south that used to cause obstruction in the movement of the army during the wars (Al-SamarraI, 2019, p. 395).

Militarily:, Militarily, the Rwandan revolt after the capture of Kufa was a major motive for choosing Baghdad as their capital, so al-Mansur planned it by igniting lines of cotton and ash to determine the site, and then proceeded to dig foundations.(Al-Jabawi,1992,p626)

Culturally: Baghdad is characterized by cultural diversity, thanks to the mixing with peoples such as the Persians, Indians, Romans and Syrians, which led to the translation and Arabization of sciences and arts. The development of mathematics and astronomy, in addition to the beginning of using of the astrolabe and zero in calculations, the flourishing of Islamic sciences (the Sunnah of the Prophet, interpretation, jurisprudence, sciences related to the Qur'an)



FIGUR (6) Watercolor from Kashmir showing pulp preparation and papermaking.

[Paper and the history of its manufacture in the Arab-Islamic civilization | Al-Furqan](#) Source: [Foundation for Islamic Heritage](#)

Naming: There was some disagreement about the naming of Baghdad. Some attribute the origin of the name to the gift of a person to Khosrow (Baghdadh), but the jurists did not like this name because Bagh (means devil) and Dadh (means gift), so the general concept refers to polytheism. Some say Baghdad or Baghdad, where Bagh indicates (orchard) and Dadh (man's name), but the name City of Peace was invented by Al-Mansur (Hamadi, 2020, p. 11).

The urban form of the city of Baghdad

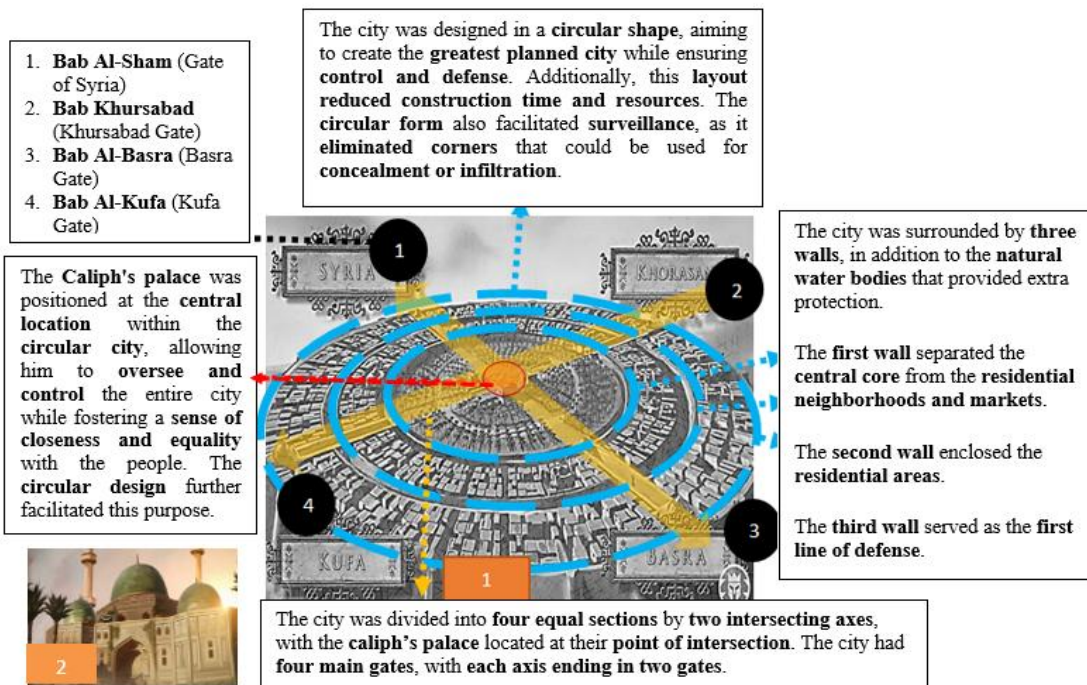


Figure (7) The City of Baghdad and an imaginary image of the caliph's palace.. Source: [Baghdad Burns: Fall of the Abbasids](#), researcher using AI-generated software.

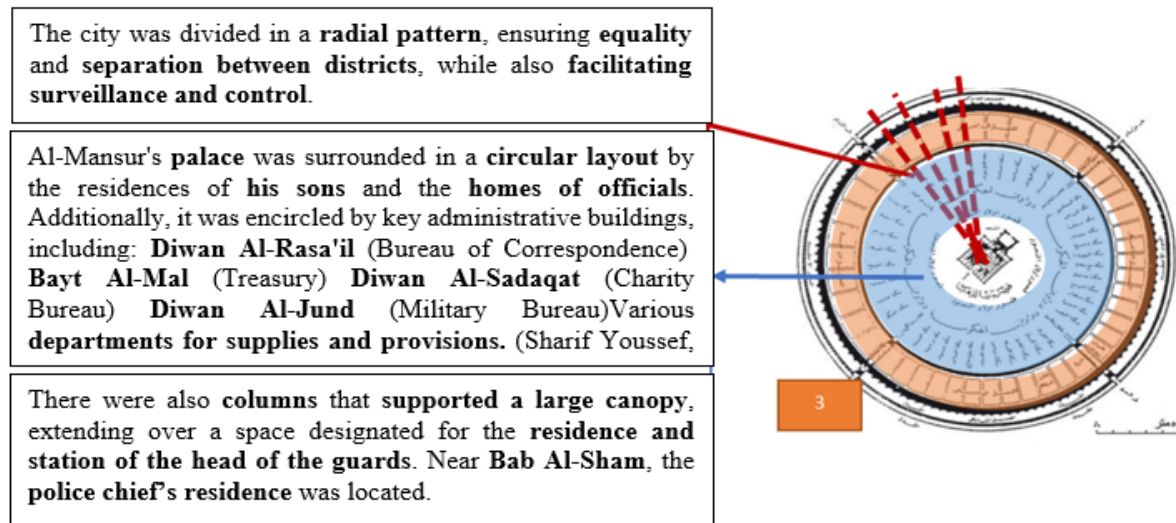


Figure (8) Plan of the City of Baghdad and a Conceptual Illustration. Source: (Round City of Baghdad – Alchetron, The Free Social Encyclopedia).

Each of the four sections of the city was provided with a gate, as there were 4 gates with high towers in addition to the canal surrounding the city. (Hamdan, 2023, p. 184).

The adoption of the circular shape of the city of Baghdad reflects the influence of the Persians and their desire to strengthen security and power (embodying the centrality of the caliph) by separating neighborhoods from each other and placing markets in places far from the center. This is the opposite of what is known in previous Islamic cities.

7_4_2 Urban form of Baghdad in the late Ottoman era:

Political and military: The Ottoman period witnessed instability and lack of noticeable development and progress, especially at the urban level, due to the multiplicity of governors who ruled during this period, whose term of office did not exceed one year, which was not enough for them to carry out any kind of reforms or development projects (Suad, 1987, p. 44)



Midhat Pasha came to power in 1869, marking a historic turning point for Iraq by initiating administrative and development reforms in accordance with Ottoman laws. (Al-Taie, 2023.)

All these reasons, and to their departure, had a major impact on the deterioration and backwardness, and included many aspects that were not limited to the material aspects.

Economically: The Tabu system contributed to improving the economy, but its benefit was limited to the landowners and tribal sheikhs, which strengthened their connection to the Ottoman empire and increased their wealth at the expense of the peasants, while the percentage of Bedouins reached 25% and the countryside 50% in 1890. (Al-Dulaimi, 2022, p3)

Administratively: Administratively, the influence of Western architecture began in the eighteenth century with the Ottomans, where they relied on Armenian engineers and appointed architect of the empire, encouraging the Western style, as clearly demonstrated in the Ottoman Nur complex in which the influence of Rococo and Baroque architecture appeared greatly. (Al-Taie,2023)

The need for the expertise of foreign engineers was not limited to this, but extended to the learning of geometry and algebra in Ottoman schools with their Greek roots, which led to the use of the golden ratio in architecture.

However, the Ottomans did not use the development of materials such as reinforced concrete on a large scale, but rather it was very limited, but the radical transformation that occurred was the creation of new patterns and the abolition of the known and prevailing building patterns in previous periods in general,

as a result of the Ottomans' interest in military and political factors. as the city was fortified by walls and gates, and it appeared clearly in the urban fabric (a military city). As a result of the Ottomans' interest in military and political factors, the city's planning during their period was fortified by walls and gates, and the urban fabric became a (military city).

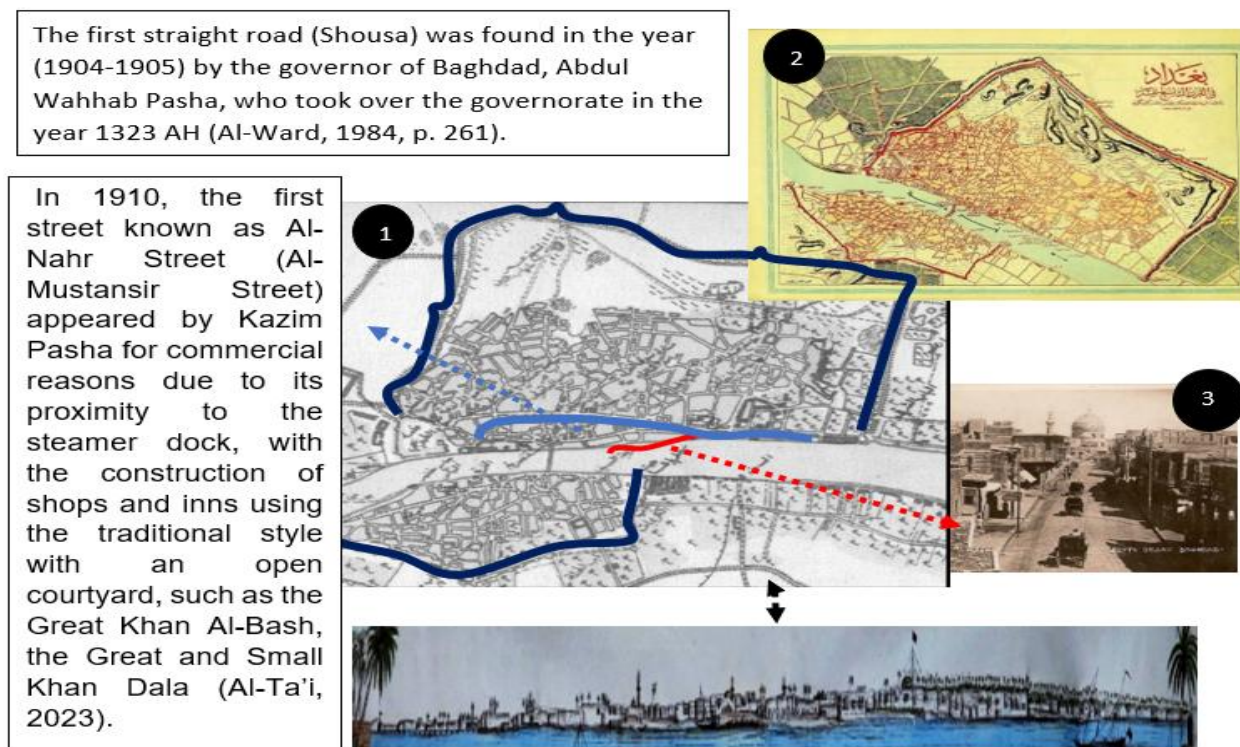


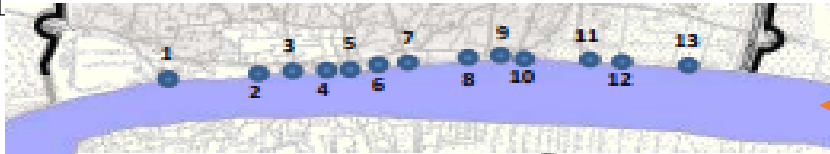
Figure (9) : 1 Plan of Baghdad during the reign of the Ottoman governor Muhammad Rashid al-Kozlaki (Abdul Nabi, 2017, p. 75), No. 2: Plan of Baghdad in the nineteenth century, No. 3 Halil Pasha Street (Rashid Street and the entrance to the Haidar Khana Mosque <https://www.flickr.com/photos/oboudi2001/4193888594> ,and the facade of river in Baghdad in the Ottoman era drawn by Felix Johns 1858.

The important brick and architectural feature of the two sides of the river is placed (Al-Waili, 2017, p. 61).

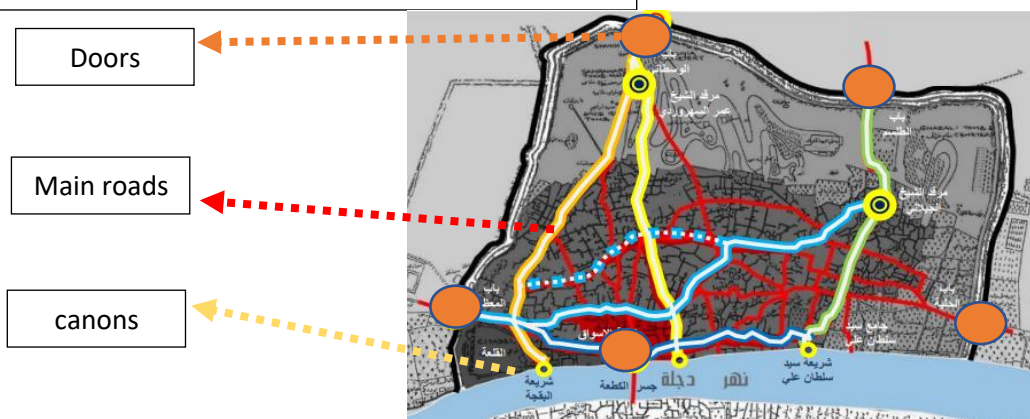
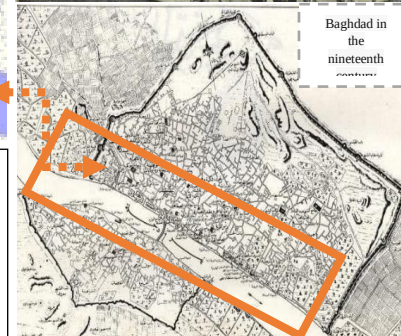


Figur(10) A map of Baghdad prepared by Felix Jones and Kolenkood showing the two parts of the city of Baghdad. Source:(Sana,2013, p1087).

The city is divided into two parts (sides) separated by the river, and each part is surrounded by a wall. Karkh is located on the western bank, and on the east is Rusafa, where Rusafa took the irregular rectangular shape and forms the largest part. The two sides are connected by the (Al-Kat'a) bridge, and the river forms the main artery of transportation and a source of life, in addition to the pleasure and entertainment it provides.



The movement is done by what is known as (canons) which represent the basis of transportation systems as they are located on the river bank and help in loading and receiving goods in addition to crossing the river by pedestrians and can be reached by slots and there are about 13 canons



Figur(11) Movement paths Source: (Al-Waili, 2017,p63)and researcher's analysis

We notice that there is a kind of gradation and clear sequence in the paths of movement, starting from the canons, alleys and main streets, from which the alleys branch out, which in turn reach the densely packed residential units. The streets connected to the gates are an essential part of the pedestrian and transportation system, and through them the connection between the religious buildings and the markets takes place, and they also end in turn at the canons, that represent and embody river transportation

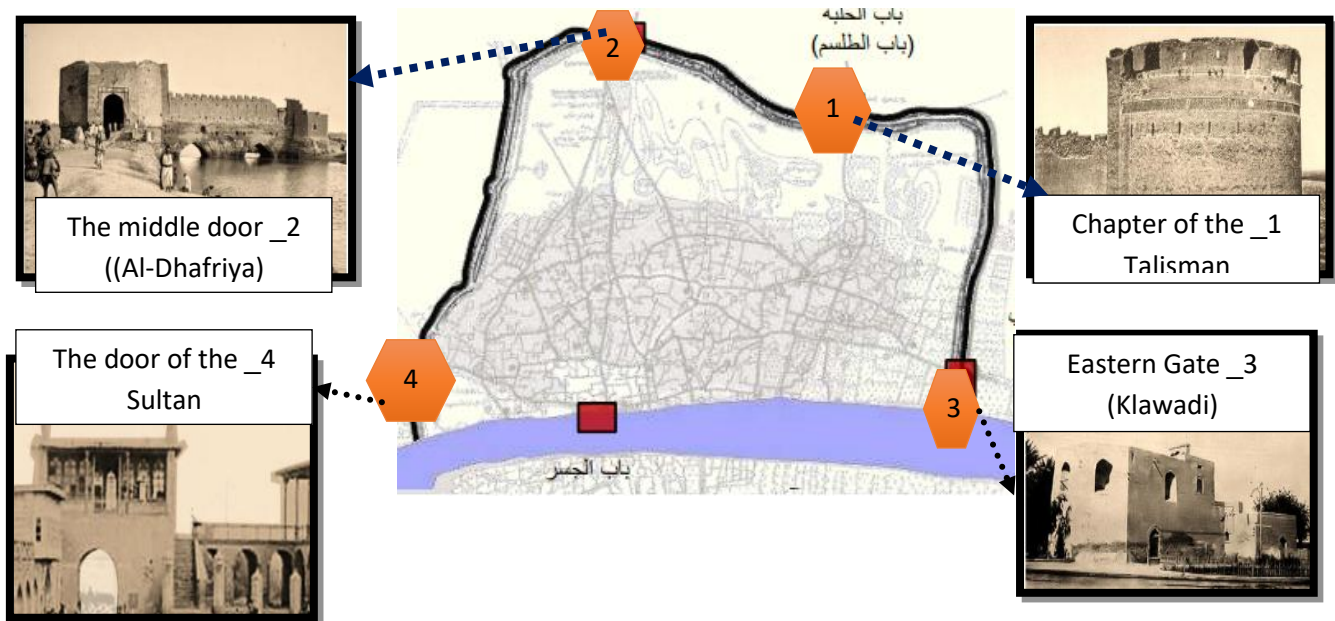
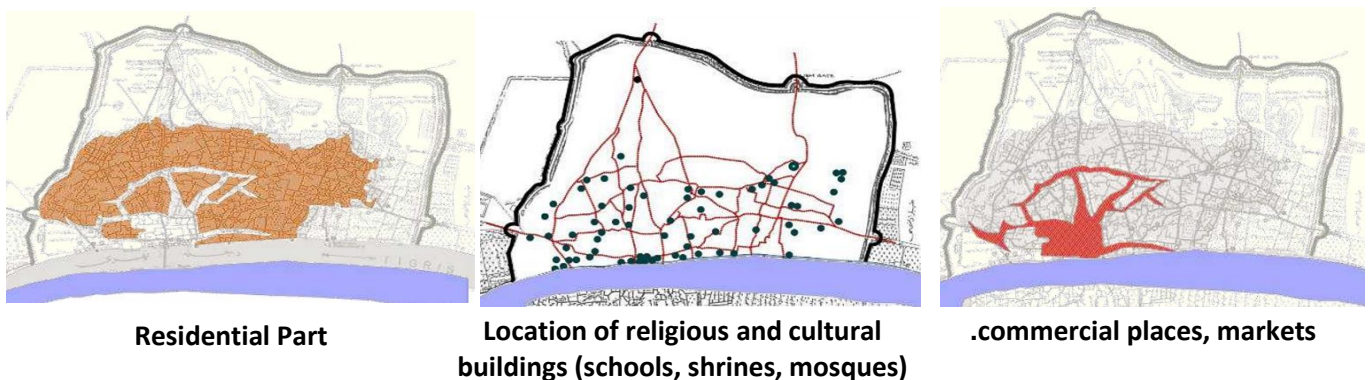


Figure (12) depicts the doors . Source: (Al-Waili, 2017, p. 64,65)







which strengthened its commercial position and led to the establishment of the Berlin-Baghdad railway. This resulted in an urban development. both economic and political factors led to the emergence of contemporary Iraqi architecture, which embodies the contradiction between bureaucracy and international commercial life.

Economically where it entered the modern era through economic development and the expansion of trade in the nineteenth century, which led to the establishment of modern infrastructure and buildings with new standards, distinctive features of the modern era.

The first basic plan was drawn up by Colts upon the request of Sultan Abdul Hamid for military assistance and organizing the army to repel the Russian expansion. He saw that Baghdad had narrow alleys that were not suitable for transporting the requirements, so he worked with Muhammad Raouf to draw up a new plan 1916. (Al-Moussawi, 2017, p. 35)

The first basic plan for Baghdad was developed in 1916 by Colts in response to Sultan Abdul Hamid's request to organize the army and confront Russian expansion, after noticing the narrowness of its alleys and its difficulty in transporting supplies (Al-Musawi, 2017, p. 36).

On the day of the proclamation of the constitution in 1916, a transverse road was paved and known as (Khalil Pasha Avenue). The street was opened on July 22, 1916. The street extended from Bab al-Muatham to the Sayyid Sultan Ali area. It had another name (the public avenue or Rashid Street currently). The names were fixed on a piece of glazed tiles that was placed above the base of the minaret of the Sultan Mosque in the corner opposite the south. Unfortunately, this piece was destroyed during the renovation of the Sultan Ali Mosque in 1932 (Al-Wardi, 2014, p. 304).



Another street that witnessed this period was Al-Mustansiriyah Street (currently Al-Nahr), but it came as a result of commercial requirements, unlike Khalil Pasha Avenue, which, was for purely political purposes.

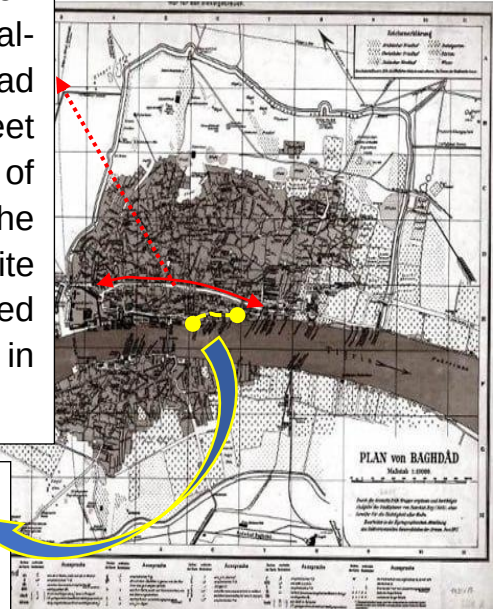


Figure (15) depicts a map of Baghdad drawn by Commander Colts in 1916. Source: (Al-Moussawi,2017,p35).

A kind of transformation occurred here in the urban fabric, which was the paving of roads, after the fabric in the previous Ottoman period was a compact and cohesive fabric, and this was due to several reasons (motives):

personal Reasons motive reasons: where the rulers wanted to leave a historical imprint for them by opening streets and naming them after themselves, and this in turn reveals a kind of contradiction between personal and official goals.

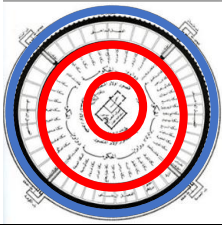
military motive reasons: the desire to reflect and embody the state's dedication to facilitating the movement of the army and their equipment by paving roads, which in turn constitutes a fundamental aspect of the dynamics of the conflict.

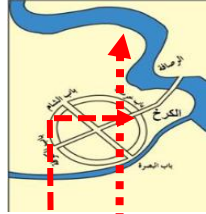
Economic motive reasons: The costs of reparations for opening streets in the war have shrunk, as immediate payments have been replaced by deferred bonds, alleviating the financial burden and conflicts.(Suad,1987,p218)

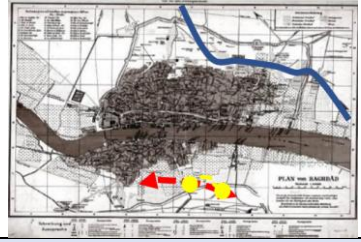
The urban fabric during this period witnessed the beginning of the change from the organic fabric towards the engineering pieces and the regular road network as a result of the entry of Western trends and at the architect and urban levels.

1_8 Practical framework

Comparison and analysis table (prepared by the researcher)

Period	Boundaries (general form)
Abbasid era	adopting a circular geometric shape for the city from the outside and inside with three walls instead of one wall city and fencing 
Influencing factors	Political and administrative factor: Regimec caliphate, invasions Cultural factor: influence by Sassanian thought Natural factor: geographical location Social factor: equality

Late Ottoman Period	expansion of the city outside the borders at the expense of agricultural areas. The change from a circular shape to a semi-rectangular shape divided into two parts on both sides of the river, the first which is larger in size and takes a semi-rectangular shape, and the second (almost similar to the planning style of the city of Babylon). The change towards the construction of dams	 
Influencing factors	Economic factor: traditional feudal economy, increasing population growth Administrative factor: introduction of the taboo system Natural factor: disasters (floods)	
German colonialism	The city did not witness any significant change in its general appearance during this period	
Influencing factors	Economic factor: Increase in imports. Administrative factor:	
Period	Paths (Road network)	
Abbasid era	Change towards adopting radial rather than organic form main paths The change towards dividing the city into four sectors and emphasizing the inward orientation (where the paths constituted a new	
Influencing factors	Political and administrative factor: control of army movement, trade, population movement Economic factor: economic prosperity	
Late Ottoman Period	The change from radial planning to organic paths (regular fabric of narrow alleys), The starting point of the main paths changed from starting from (the central core) to starting from the canals on the river with a clear sequence and gradation from which secondary paths branch out and from them to the alleys that reach the residential units. The construction of the (Al-Kat'a) Bridge to facilitate transportation and movement between the two parts of the city and the first straight avenue (Al-Shousha)	
Influencing factors	Economic factor: trade	

German colonialism	The change towards the construction of transverse roads for the first time and the first road was known as (Khalil Pasha Avenue). The construction of what is known as the River Street for commercial purposes, change from a cohesive and organic fabric to a perpendicular fabric. change in means of transportation appeared (the tramway line) and the Baghdad-Berlin railway 
Influencing factors	Political and administrative factor: German colonization (facilitating the movement of the army) Psychological factor: the ruler's self (leaving his mark) Economic factor: trade, low costs Technological factor: the emergence of vehicles
Period	Neighborhoods and areas
Abbasid era	The change towards dividing the city into four equal sectors in a radial manner towards the center. Another change is separating each neighborhood by walls to facilitate monitoring and management in addition to separating it from the administrative center
Influencing factors	Social factor: equality Political factor: protection and security
Late Ottoman Period	The change towards dividing the residential neighborhoods into groups (small districts) each belonging to a sect or religion. The neighborhoods changed from being purely residential to multi-use, religious, cultural, and some markets. The arrangement of the city changed, so that the military and administrative area took a side location south of the river, followed by the commercial area, which overlapped with the residential area and was interspersed with religious and cultural buildings, with the separation of the walls removed, except for the administrative and military part, which was like a fortress  Administrative  Residential part  Commercial
Influencing factors	Social factor: displacement and migration (diversity of population structure)
German colonialism	Expansion in commercial areas and encroachment towards residential areas, the beginning of change and transformation from residential to commercial use (functional usage overlap within the same area). The change in residential usage is the expansion on both sides of the river after the construction of dams
Influencing factors	Economic factor: Trade Natural factor: Disasters
Mass to vacuum ratio	
Abbasid Era	Due to the circular and well-organized planning, a balance was achieved between the proportion of mass and space (religious buildings, walls, administrative buildings, residential buildings) and space (traffic paths, areas around buildings).
Late Ottoman Period	The percentage of voids is less than the mass, and this is due to the cohesive nature resulting from the regular fabric due to the increase in population density and the economic factor, and the voids were limited to the alley areas and the spaces around the mosques and markets, despite some changes in the infrastructure.
German colonialism	The mass ratio is greater compared to the void, despite the construction of new roads and some change in infrastructure (Railway and tramway).



Conclusions:

- The transformation in urban design was not limited to the influence of one factor only, but rather the interaction of many factors, The most important ones are environmental, economic, cultural, political, and religious, which led to the formation of urban structures across these periods and the embodiment of societies and their ability to grow and adapt.
- The round Baghdad, the main and influential factor in its planning was the political and religious factor in terms of the shape and division of the city, the economic, and then the social and environmental.
- the factors influencing the form of the city of Baghdad in the late Ottoman era, it were the economic factor and the increase in population growth, followed by the political and natural factor, and then the social, religious, and cultural factor. In the colonial era, the political and economic factors came first, and then the other factors.
- During the Abbasid period, Baghdad took into account all influencing factors—political, economic, religious, social, and environmental in its formation and growth, shaping itself into the finest model and the center of Islamic civilization as well as the capital of the caliphate. In the subsequent periods, Certain factors were taken into account leading to changes in the infrastructure and the introduction of new patterns previously unfamiliar (the beginning of hybridization between traditional and modern forms). These transformations also marked a shift toward a departure from the previously established planning principles.



- The economic factor in the period between the late Ottoman era until the beginning of the twentieth century led to an increase in population growth and poor planning, in addition to random expansion at the expense of agricultural land, which led to the overlap of functional uses and the loss of the identity of the old city, and this is unlike the rounded Baghdad with organized and thoughtful planning in the Abbasid era.
- Baghdad remained conservative on the administrative borders and the transformation and development occurred longitudinally on the river with the risk of floods. The development of the edges made them attractive places for residential, commercial, and administrative uses.
- Baghdad preserved the unity of its architectural form within the traditional parts during the period of the late Ottoman era until the beginning of the twentieth century, as it consisted of a less dense modern section and a denser traditional section due to the stacking between the units and the urban fabric

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