Informal urban transformations with the influence of society Case study: Karada Dakhil

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Abstract – Cities are usually formal, but in reality they all represent a mix of formal and informal processes. Both formal and informal are linked to multiple and complex relationships resulting from the interaction of society and its impact on its urban environment, making it constantly changing and unpredictable. While the idealistic view of traditional urban planning and urban design theories has set aside complex multi-level relationships, and limiting the population to mere users of well-designed, meticulously planned, and ideal formal urban environments. This research will study the informal urban transformation occurring in a planned city with community influence, such as changing the nature of use and the type and distribution of jobs - by studying the (Karada-Dakhil) area in Baghdad as a case study.

The research aims to explore the underlying causes of these informal transitions and the role of the community. The research assumes that these transformations result from the interaction between society and the urban environment and its use, which are often different from long-term holistic schemes developed by a stable virtual reality. To achieve this, the researchers used the methodology of the space structure rules for analyzing the study area by several measures (Integration - Choice - Control).

Keywords –Informal transformation, Urban Informality, Urban Planning, space syntax

INTRODUCTION

Informal practices are present in most cities of the civilized world, no matter how progressive or imposed. They are optimistic and indispensable, and they are a reaction to strict, comprehensive planning laws long-term. Nor is it a modern phenomenon; it predates the emergence of the modern state in the nineteenth century and all the associated rigid planning concepts of modernist thought, as well as economic and political aspects[1] .There is a difference between how a city is planned, designed, built, utilized and interacted with by the community [2] .A planned city is a closed city with top-down planning boundaries and the perfect idea of modernity to make a city a highly professional machine [3]. Urban planning is the process of designing and distributing land uses, the built environment, infrastructure, transportation networks, and others, and developing and directing them according to long-term, comprehensive plans [4].It determines how society lives, works, plays and moves with a high degree of detail, personalization, and idealism. It overlooks society's decisions and behavior in choosing the right way [5]. While cities need a different urban system that respects the interaction between physical space and the built urban environment and the social behavior of people living and employed, such relationships become burdensome for a city when planned and shaped strictly, precisely and in writing, independently of society and its nature [3].The way cities grow and change after being occupied by society is often informal. Informal urban processes reflect informal economic and social processes formed or manifested within the formal city structure outside the laws and planning controls of the state and are distinguished by respecting complexity, ingenuity and creativity with daily adaptations and changes. In contrast, real growth in cities must be non-linear, more flexible and more open [6]. Often these operations result from a lack of available options, as informality is a framework for understanding the growth and expansion of informal activities within the formal planned cities[7].

The purpose of this study is to explore the causes of these informal transformations within the planned formal city and the influence and role of society in its events, as they reflect the realistic behavior and the natural reaction of the population and their interaction with the urban environment in which they live, by analyzing the elected study area (Karada Dakhil in Baghdad) and monitoring the urban changes taking place there from the establishment of the master plan (1972) until the present.

1. THE CASE STUDY (KARADA DAKHIL IN BAGHDAD)

Al-Karada is located south of Baghdad in al-Rasafa district on the eastern side of the Tigris River (Figure 1). The area is generally considered an essential part of Baghdad due to its large population and geographic size. It is one of the largest residential areas in Baghdad and it is connected to a modern main road network with the city center and its proximity to the center, It also represents an important mix of commercial, industrial, and cultural jobs, and contributes significantly to the employment of the workforce, which employs at least one-quarter of the labor force in the entire governorate [8].The arteries contain significant movements, the most important of which are (Karada Dakhil) Street and al-(Karada-Kharej) Street . The study area includes (Al-Karada Dakhil) Street in Baghdad, one of Al-Karada's main streets (Figure 2). It runs parallel to (Abi-Nawas) Street from the Al-Karada entrance in Kahramana Square to the Al-Jadiriya area and represents a critical lifeline. Perhaps the most famous of these "Al-Attar Street", "Assfar Street", "Aswad" street, and "Klwatha" street. Its importance began after it was paved in the middle of the twentieth century. Its commercial activities began to increase, especially after the construction of the suspension bridge and the increase in traffic during it.

Figure 1: The location of the study area within the city of Baghdad

Figure 2: The boundaries of the study area, AL-Karada Dakhil axis, the secondary axes branching from it, and the intensity of the distribution of commercial activities in it

The distribution of land use and the establishment of formal regulations and standards in Baghdad are generally governed by the Basic Design Law of the Polish company Paul Servs, which was prepared in 1966, was prepared in 1971-1972 and is in force until 1990. The master plan design defined the distribution of land use in the Karada area, mainly for residential use, with commercial

use on the east bank of (Karada-Dakhil) Street and part of the West Bank (Figure 3) and a mixed-use between commercial uses in the lower floors and residential in the upper floors. This is not in line with the reality of the commercial use, as it extended into the alleys to interfere with the residential function.

Gradually the housing overlooking it began to turn into multi-use buildings (the ground and lower floors are for commercial use, and the upper floors as offices, clinics and apartments)[9], then gradually the upper floors became occupied as stores or offices and various companies, and extended into the alleys branching from it to overlap with the housing, in addition to conversion the space on the sidewalks of streets to informal commercial space which called "Pavement Plaza" [10], so the commercial function became dominant and thus effecting a change in land use.

The conversion of land use from residential to commercial use is considered informal for violation of the Basic Design Law for the City of Baghdad in Article (12), paragraph (1): "The land may not be used, or any construction work may be initiated therein, including the division of the land for the various purposes covered by the basic design in an area that is part of a detailed design in force, unless this conforms with the requirements of this law and the regulations issued thereunder, by the basic and detailed design plan certified and following the prescribed uses for the same area or part of it" [11]

Figure 3: land uses Distribution according to the master plan

Figure 4 : Expansion of commercial use in the region

These informal transitions were driven by society and gradually through the transformation and sale of housing by their owners into commercial buildings, transforming the essential use of housing in the master plan design. To achieve the purpose of the research, the elected study area will be analyzed, and informal urban transformations will be explored in it from the establishment of the master plan for the year (1972) until the present time to know the reasons behind these informal transformations and the role of society in their events.

2. METHODOLOGY

The research uses the space syntax approach to analyze the study area at present in terms of the distribution of land uses and its functional nature and their comparison with the 1972 master plan. Furthermore, that is by using several program measures (Integration - Choice - Control). Then analyze the results to reach the conclusions.

2.1. SPACE SYNTAX APPROACH

Space Syntax methodology is a set of theories and techniques for analyzing spatial plans and patterns of human activity in buildings and urban spaces through theories that link space and society by analyzing people's whereabouts, movement, adaptation and evolution with space [12]. A single software platform enables us to analyze a spatial network designed to understand social processes within the built environment. Professor Bill Hillier set the rules of space composition with the help of Julien Hanson and their colleagues at University College London in the late 1970s. He started by noting that space is the common ground of the physical and social components of the city [13]. The Space Syntax methodology consists of essential components used in all Space Syntax applications, which represent space by representing spatial elements, their geometrical formations and how people experience them, and then deriving them geometrically. An Analysis of spatial relations, where the relationships between spatial elements can be analyzed objectively [12] .An axial map is one of the most critical Space syntax techniques used to study spatial schemes at different scales, in addition to newer technology. This segment map is formed by dividing each axial line at intersections with other lines, where these charts represent the elements of the representation of space.

The measures used in the search are defined as follows:

1- **Integration**: It is a standard measure of the distance from any origin space to all other spaces in the network in general [12]. Integration is one of the most used measure, which indicates ease of access, as high integrity values indicate lines that have better connections with the rest of the lines in the network. In comparison, low values indicate lines with fewer connections with

other lines. Integrated values are represented graphically on the map using a color scale ranging from red (highly integrated) to blue, indicating less integrated or Segregation streets.

Integration core: They represent 10% of the most integrated network lines, and conversely, the Segregation core represents 10% of the most isolated network lines [14].

2-   Choice: The choice measures the probability that an axial line or street segment will pass along the shortest route from all areas to all other areas of the entire system [12]. It is also one of the most commonly used measures of space syntax. The choice gives the degree to which the line falls on the most straightforward path from one line to another in the network. The option measure indicates the probability of selecting the line on potential routes from one line to another in the network, which are more accessible and have fewer transactions (maximizing access) [15].

Choice core: The choice core represents 10% of all streets are in a network with a higher choices value.

The two measures **(Integration and Choice)** are linked together, where the first represents the access point. The more axes the network leads to, the more the integration value increases and the more manageable the access becomes. The choice is related to choosing the best of these axes for access or axes that achieve the highest percentage of an option. [15].

3-   Control: The Control Measure measures the degree of choice that each of its immediate neighborhoods represents as the space to move in and out; it measures the degree of control of its access from its vicinity. Each area has a specific number of its direct vicinity, gives each one a 1/k ratio, and then it is collected for each area to give the control values for that area. Areas with a control value greater than one will have more robust control and thus greater visual dominance, and those with less than one will be weak control areas with less visual dominance [12]. In axial diagrams, the measure of control represents the degree to which a track controls access to its immediate neighbors, considering the number of alternate connections each neighbor has. The control value represents the degree to which a line is essential for accessing neighboring lines. Higher control values indicate that a path is important and necessary for connecting to adjacent paths. The measure of control is also related to the integration measure, as easily accessible urban paths or spaces (more integrated) display higher control values over the permeability of adjacent streets, and therefore experience more significant pedestrian traffic [16]. **(K:** count of immediate neighbors)

These measures illustrate the spatial properties of urban network Axes and spaces and guide to social indicators, i.e., some of the locations in the network are naturally rich in motion (the most valuable for both integration - choice and control), while others are naturally immobile. Based on this movement, activities and land uses will be signed. For example, activities that benefit from the movement, such as trade and others, will move to the more traffic-rich parts of the network (these activities will attract more movement, and then these will attract more and more diverse uses (multiple intensifications of movement and use). At the same time, jobs with a low level of movement will move to poor areas with this type of movement (which have lower values for the previous measures and higher values for the depth and insulation measure) [17]. High integration values indicate complex urban centers where the events overlap and this integration results from the gradual and cumulative growth of the region and its actors.

This integration includes functional integration and integration of the natural and built structure with the social network and the lives of individuals [18]. Whereas in regions where integration values are low, and isolation values are high, complexity is not appropriate for residential areas that need calm and reduce relationships and overlap. High option values also point to an intensive social movement towards more integrated spaces. It is also the most likely of informal practices, which tend to choose socially and economically active places, to ensure regular participation in the broader spatial economy of the region [19].

2.2. DATA PREPARATION AND ANALYSIS:

The analysis process using Space Syntax identified the practical study area based on a high-resolution aerial map of the Karada area within 2020. The map was obtained by the Geographic Information Section (GIS) of the Design Department in Baghdad Secretariat and was entered into the Auto CAD program to map the area. It is then saved as a (.dxf) formula for insertion into the DepthmapX software. The required type of analysis is then determined, and the specific values for each of the space structure measures are obtained. The core maps for analysis were used, followed by the CT maps with a focus on specific metrics for analysis (integration - option - control) being the most relevant to the research topic.

3. RESULTS AND DISCUSSION

The search through this paragraph reviews the maps resulting from the study area analysis (Figure 5) and (Figure 6), whereby each chart indicates a single measure of the space composition rules according to the program's color gradient from red (representing the highest value of the scale) to blue (representing the smallest value of the scale), and the results of each.
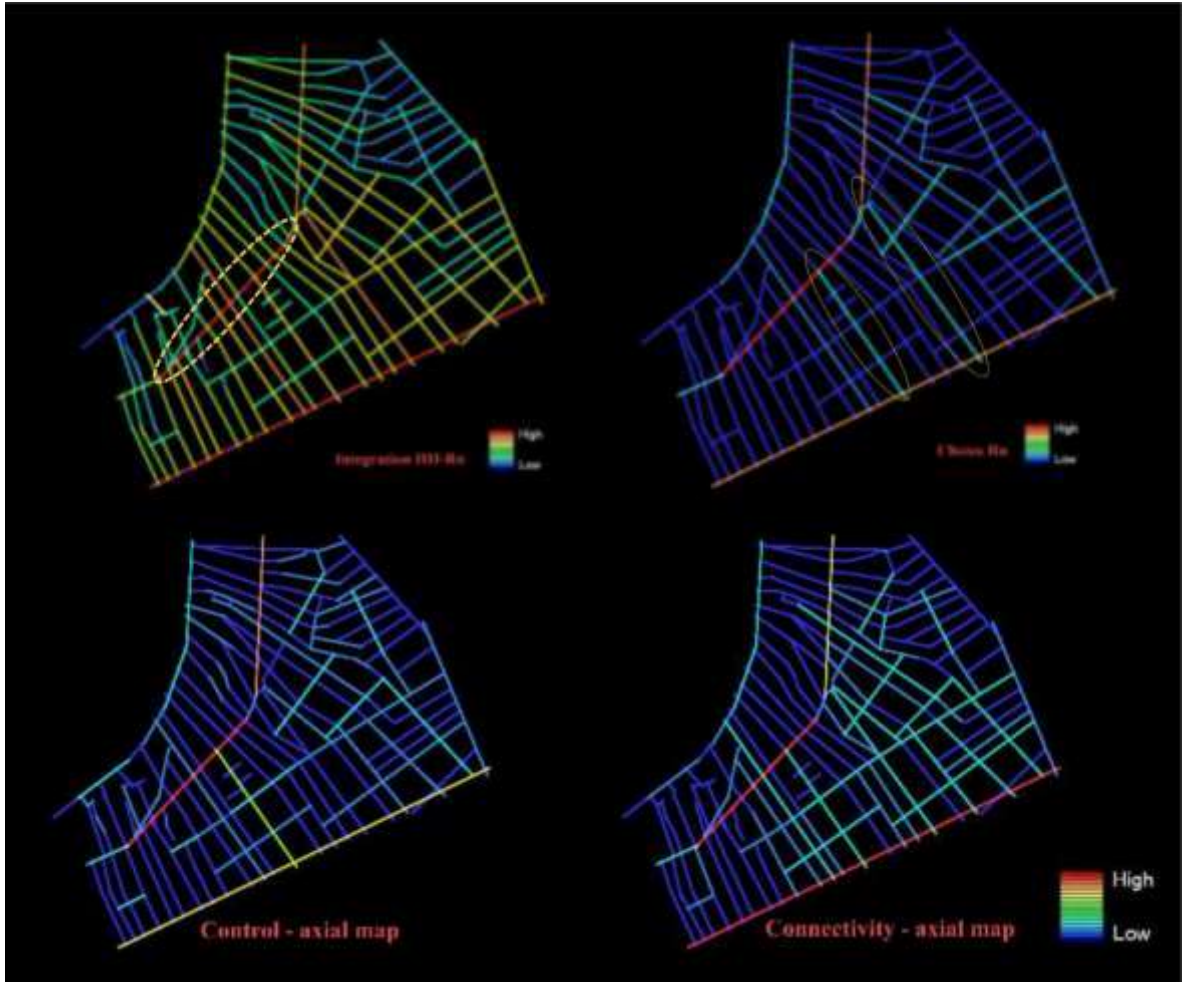
Figure 5: Results of Axial analysis of (Karada Dakhil) map according to space syntax – Integration, Choice & Control measures
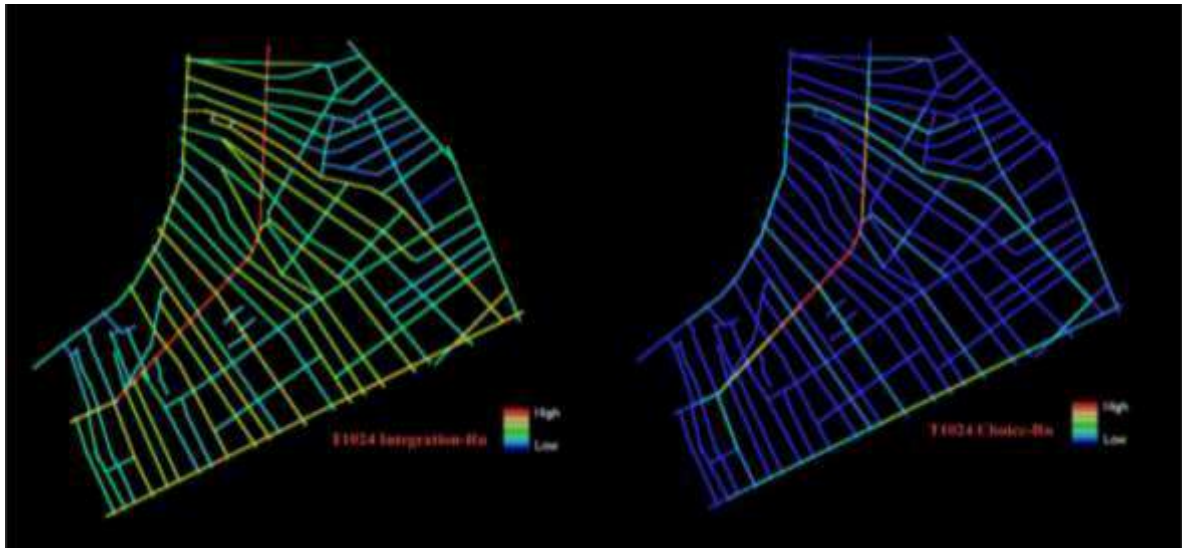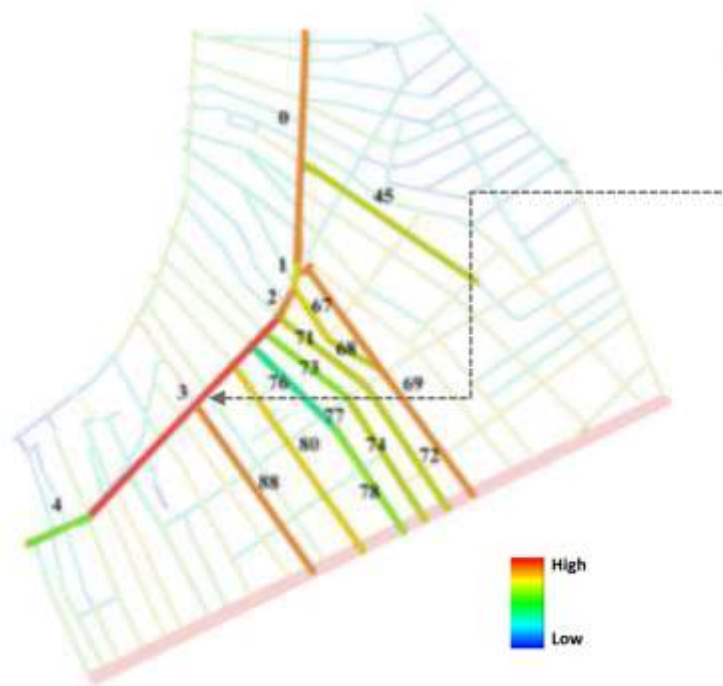

Figure 6: Results of segmental analysis of (Karada Dakhil) map according to space syntax – Integration and Choice measures

REF	Integration	Choice	Control
0	1.95	6822	7.48
1	1.84	3424	1.05
2			
3	2.06	9469	8.74
4	1.54	2449	3.12
54	1.68	1515	1.10
63	1.78	1618	0.69
67	1.78	845	0.86
69	1.96	2635	0.94
71	1.70	447	0.45
72	1.64	107	0.66
73	1.59	202	0.38
74	1.63	338	0.78
76	1.47	26	0.18
77	1.26	7	0.47
78	1.52	191	0.68
79	1.70	606	0.31
80	1.88	2292	4.70
88	1.90	1852	1.42
Average	1.39	616.98	0.99
Max.	2.06	9469	8.74
Min.	0.82	0	0.08

Figure 7: The most integrated axes in the region and their REF numbers

From the results of previous analysis using the space Syntax, the research conducted that:

- Al-Karada Dakhil Street is a section that achieves the highest value of integration (Figure 5), and represents the core of integration for the study area, especially the central axis (REF 3), located between the (Abu Aqlam) intersection and (Al-Oruzdi) intersection (Figure 7). A number of streets that are branched out of it have achieved high to medium integration values, such as (Al-Attar) Street (REF 80), (Aswad) Street (76-78), and (Assfar) Street (REF 73-74). This makes it an easy-to-access destination for the rest of the network through the largest number of routes connected to it, and consequently, greater pedestrian traffic will be expected from it, as it is the main artery of traffic in the network due to its high integration and connectivity value.

This is consistent with the reality of the situation, as it is the most intensive in pedestrian and car traffic because it has a strong link with the broader network. The same is true of the secondary streets in which the research mentioned the program, which shows good values of integration - while we find that the two axes (REF 45 and 88), which have high integration values, do not represent dynamic axes and are limited to the movement of residents and cars in general, and this is due to the type of jobs close to them, which are represented by the cafes of the male only for the first axis, while for the second axis due to the presence of the (Abu-Aqlam) fuel filling station Which constitutes a motor, visual and functional interruption for pedestrians, which weakens the movement inside it.

Thus, those parts of the network that have achieved the lowest integration values (the most segregation and forming the segregation core in the deep areas of the network and beyond the main arteries of traffic) will be less intensive as they have fewer connections with the main streets of the network, and thus will be more isolated, more private and more suitable for the residential function (Figure 8).
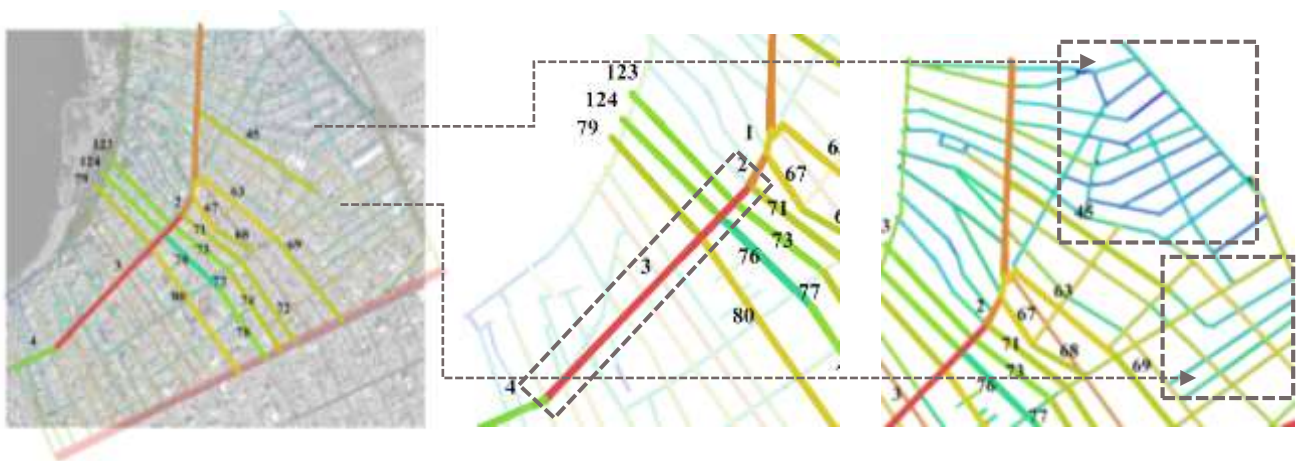

Figure 8: Most Integrated and most segregated parts in Karada Dakhil area

-       The analysis results also indicate that the core of the choice scale in (Al-Karada dakhil) Street in Baghdad (Figure 7), specifically between the (Abu Aqlam) intersection and the (Al-Oruzdi) intersection (REF 3), gradually diminish toward the outskirts. Being the most integrated with the rest of the network, it has many associated routes (access options). Here, the influence of the choice scale in determining which of these routes is the most chosen by people to reach the main street, which achieves the most efficient destination. We find from the program analysis results in the highest values of choice within the network in the main of (Al-Karada Dakhil) Street, which is the main artery of the network, but we exclude it as it is the target of access. This confirms that these streets are the most likely option for people to move through towards a more integrated route and thus will have a high traffic density (whether in cars or pedestrians). This, in turn, is also in line with the reality that these side streets are among the most active routes within the area, especially pedestrian traffic.

-       As for the highest measure of control, we find it on (Al-Karada dakhil) Street (Figure 5), in the area between (Abu Aqlam) intersection and the (Oruzdi) intersection (REF 3), as well as from the (Abu Aqlam) intersection towards (Kahramana) square with a medium control value (REF 0). This indicates the importance of Al-Karada Street within the main traffic artery within the studied network and that it is the most chosen area and adjacent path for travel to and from it. Furthermore, this is consistent with the fact that it is very mobile. It controls the penetration of traffic through it to other spaces and its adjacent pathways, and therefore it will have substantial control and greater visual dominance.

As for the sub-streets such as (Al-Attar) Street, (Aswad), (Assfar) and the street extending from (Abu Aqlam) intersection towards (Karada-Kharej) Street outside, they recorded medium to invalid values in the (control) scale, and this indicates that it is not the highest choice in terms of (control). However, it is. This obtained high values for the (Choice) scale as it represents the paths that achieve the most efficient access to the most integrated destination. As mentioned, this is consistent with the reality of the situation, as it has a high kinetic density.

The high values of both **(integration and control)** indicate heavy pedestrian traffic, and the high values of **(integration-choice-control)** emphasize that these parts of the urban network have the most connections with the rest of the network and are most accessible, and this makes them highly mobile and human density. These parts have a public space character that brings people together and improves performance to achieve optimal access and increase movement and participants. These features create complex interrelationships that are highly appropriate for the functions of commerce, entertainment, assembly, and meeting. When commercial activities begin in the area, (Al-Karada Dakhil) Street will most likely be chosen because of the significant human traffic that passes through it and the facility of access to it, as well as the streets that do not have the highest values of the standards as mentioned earlier (Al-Attar Street - Aswad Street - and the street that extends from the intersection of (Abu Aqlam) towards (Karada-Kharej) Street.

This is what was founded in the region's Reality as these axes represent the most vibrant and crowded parts of the region. It is dominated by multiple vital functions, especially commercial use. This, in turn, agrees with the master plan design in part, as it specified the commercial use in the east bank of (Karada- Dakhil) Street and part of the West Bank only as shown in the master plan of the distribution of land uses (Figure 3). However, we find that commercial activities expanded and extended to dominate the two banks of (Karada- Dakhil) Street (Figure 4), and informal (commercial, social, and recreational) activities have been automatically activated on the sidewalks and traffic lanes to provide more opportunities for commercial use, as the street accommodates this increase and intensification of commercial activities in it making it successful and beneficial for people with the great human momentum it has.

The same applies to most of the streets branching from it, especially Al-Attar Street, which has completely transformed from residential to commercial use - as we mentioned previously - as well as (Aswad) Street and (Assfar) Street in which commercial activities (formal and informal) expanded by 30-40%, with residential decline To the internal parts of the network, which are more isolated. This is contrary to the provisions of the master Plan rules and thus is an informal change in the nature of land uses. This is due to the inappropriateness of the housing function with the nature of these lively streets and the pattern of movement and interaction in them, as they require more isolated and private spaces, and therefore less integrated. We note here the role of the strong community in bringing about changes in response to their needs and lifestyles, which is often the best solution because they are the users of these spaces. We also note from the analysis of the axial plan that the integration values of (Karada-Dakhil) Street reach a maximum in the part of the street extending from (Abu Aqlam) intersection to (Al-Urzadi) intersection. The value gradually decreases towards the edges. Moreover, let us compare this result with the reality of the situation. We find that the activities are concentrated and more intense in this part and then gradually decrease after the intersection of (Al-Urzadi).

-As for less integrated areas, and therefore more segregated (Figure 8), they achieve a more restricted residential space for movement and relationships (between residents and strangers). Therefore, the job of housing within (Karada-Dakhil) Street and the important sub-streets has retreated to the most isolated areas of the network, to be replaced by the most important jobs, the most important of which is trade, and mainly that these transformations are the result of social behavior and its desire to bring about this change through the sale of housing and transforming it into commercial buildings and moving To the most isolated and habitable spaces.

Conclusion:

However, societal practices, particularly informal practices, make changes to basic plans (master plan) according to specific needs and relationships and interactions that can be explained by an analysis of (spatial-social) relationships using the methodology of the Space Syntax Rules, which in turn accounts for many of the changes in the primary city plans by society.

Additionally the research conclude that a society reshapes the city by exploiting the connections between the urban network and the nature of the movement within it in different ways, on the one hand, to generate interaction (in a dynamic and congested area), and on the other to restrict it (in a residential area), which is achieved and monitored by an analysis of space syntax rules.

In addition the research also extract that these changes did not take place quickly and suddenly, but rather gradually and cumulatively, to show their results in the long term. These changes are often a response to society and its requirements, such as pushing residential areas into the inner of the region, which is the easiest in terms of movement, noise, and other matters, and strengthening commercial activities in its place to meet society's needs for services and job opportunities. Also the research note that the growth of informal activities and the changes in planning laws, and the context resulting from society are driven by the needs and requirements of society and will therefore be more realistic than the comprehensive plans that are developed independently of society. They also remain within the overall official formal framework without deviation.

It is about community use of the city, interaction and change. Moreover, it is the biggest challenge and the resistance to a closed modernist city model that does not believe in the power of social behavior and its ability to change. The complexity of the relationships between it, it's urban environment and its outcomes, but believes in simplification, functional segregation, space, allocation and the high standards (ideals).

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