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SLUM REVITALIZING PLAN OF BAGHDADIYAH BY SPATIAL RE-MODELING CONFIGURATION

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Abstract: *Baghdadiyah is a neighborhood of Jeddah Downtown, Kingdom of Saudi Arabia. Inhabitants of this area come from multi-ethnic and mostly low-income residents. The high density of the area affects land use more concisely. Consequently, the beauty of the city which was used to be historic sites of Jeddah is down-grading. This study proposed to revitalize city plan for a better quality of life. The aim of this study was to re-shape a slum area and to improve the spatial configuration of urban structure based on the recent condition. The method involved several approaches: recognizing a theoretical basic concept of the slum, applying spatial re-configuration, analyzing the existing conditions and re-constructing new syntactical properties. The result of this study shared a new design of slum revitalizing plan for Baghdadiyah configuring dominated patterns of integration and connection. Adequate transport networks would reshape the city building profile.*

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1. INTRODUCTION

Rapid urbanization is changing the structure of urban space by affecting the physical conditions of the environment. This process is particularly intense in the city namely the emergence of slums. Increasing slum area appears in all the developing countries almost every year and it becomes important that the government takes a step wise to intervene this case. Referring to the circumstances in the locality of the city, the slums based on (UN-Habitat, 2004) was defined as the area inner the city that is closely related to the perception of poverty as the common characteristics of ownership and tenure insecurity lack of access to basic services.

Huchzermeyer (2011) described slum settlements as a widespread phenomenon that occurs in many countries and involves many aspects. Slums are not recognized and handled by public authorities with government policies as an integral part of a municipal management. This creates problems both socially and environmentally coupled with the unavailability of investments in these settlements (Taki et al., 2017). Hence, the importance of handling this problem especially in solving social problems, environment, and design needs an alternative responsive design strategy to provide social sustainability in the environment and the slum revitalizing plan is part of the solution to this problem (Gencer, 2013; James, 2012; Makinde, 2012).

Slum revitalizing plan according to (Lutafali & Khoja, 2011), refers to the physical development plans to improve or redevelop the conditions of informal housing areas. The revitalizing process revolves around understanding the role of the user which initiates transformation process in slum revitalizing areas. The slums of the residents are an important contributor to the development of the city by rendering their services to citizens and organization (Bhaskar & Chikarmane, 2012; Fox, 2014; Golubchikov & Badyina, 2012). To bring these weak parts into the mainstream of society, it is essential to give them proper shelter.

The contributions of slum residents to the city's economy as industrial workers, workers on the construction site, the housekeeper, fabric-pickers, peddlers and various small-scale trade are indispensable.

Baghdadiyah located in Jeddah Downtown, Kingdom of Saudi Arabia as one of the slums areas where the predominant form of settlement was unplanned. It is considered as smaller fragments of the street network. This situation coupled with a high population density causes physical and social problems as well as it causes an impact to poor connections between the surrounding urban street network and interior layouts of an area. Referring to unplanned settlements project of Jeddah by Karimi et al. (2015), some problems appear in this area such as; (1) Degraded health, environmental, socio, physical, and economic circumstances;(2) Nonexistence of good maintenance; (3) Unlawful occupation of government and private land; (4) Unreliability from claiming area proprietorship; (5) Concentration of non-Saudi inhabitant; (6) Inner infrastructure (the lack connected with the neighboring areas).

Some previous studies defined the slum (Isunju et al., 2011; Khalifa, 2011; Kohli et al., 2012), some studies to assess social dimension (Faye et al., 2011; King et al., 2013; H Taubenböck & Kraff, 2013) and others to improve the environmental aspect (Rapoport, 2016; Turley et al., 2013; Wells et al., 2016). Most researches use the social and economic approach as a basis to undertake the rehabilitation of slums areas. The examination using spatial configuration was rare. However, it can be done using the technique of space syntax developed by (Hillier et al., 1993). The technique establishes causality between the configuration of space and natural movement. Each causality was established between the space configuration and behavior patterns implying the cause and effect.

Study of the slum areas using the space syntax analysis conducted by (Hernbäck, 2012) examines the impact of urban form on co-presence in open space for informal settlements in Pune, India. The study was carried out to compare two distinct types of urban environments; one with slums. Officially unplanned area was gradually developed with an irregular road network and one area of slums more deliberately was planned with a more regular road grid. The measurement approaches utilized space syntax, organized observations, and correlations investigations. This study followed previous researches but carried out a different method. This study has remodeled slum area and compared the syntactical properties between a new model and existing condition to achieve sustainable solutions.

2. DATA AND METHODS

2.1. Study Area and Data Source

Bagdhadiyah is a neighborhood of Jeddah Downtown, located 21.54 latitude and 39.20 longitudes, positioned on the eastern coast and the largest port of the Red Sea (Figure 1). Jeddah has a population of 2,867,446. It is an important commercial center as well as the main gateway to Mecca (Islamic holiest city). The secondary data were collected for implementation of slum revitalizing plan based on the requirement from project archives of private consultant in 2016. These data were (a) location data of study area, (b) transportation data such as street network; (c) spatial data such as building categories, and land use.

2.2. Method

The method for developing the slum revitalizing plan for Baghdadiyah neighborhood was based on the space syntax technique, which combines integration and connectivity measurements. Integration assessment was performed to identify the design to-movement potential of a space. Meanwhile, the connectivity analysis was used for counting deep all line up and gets that property of the line. Taken together, these results ultimately contributed to the remodeling configuration. The literature review was conducted to gain consensus understanding on the discussion of the slum area. The model should be developed based on the environmental approach and sustainable spatial planning. The planning steps of slum revitalizing plan for Badgdadiyah were described in Figure 2.

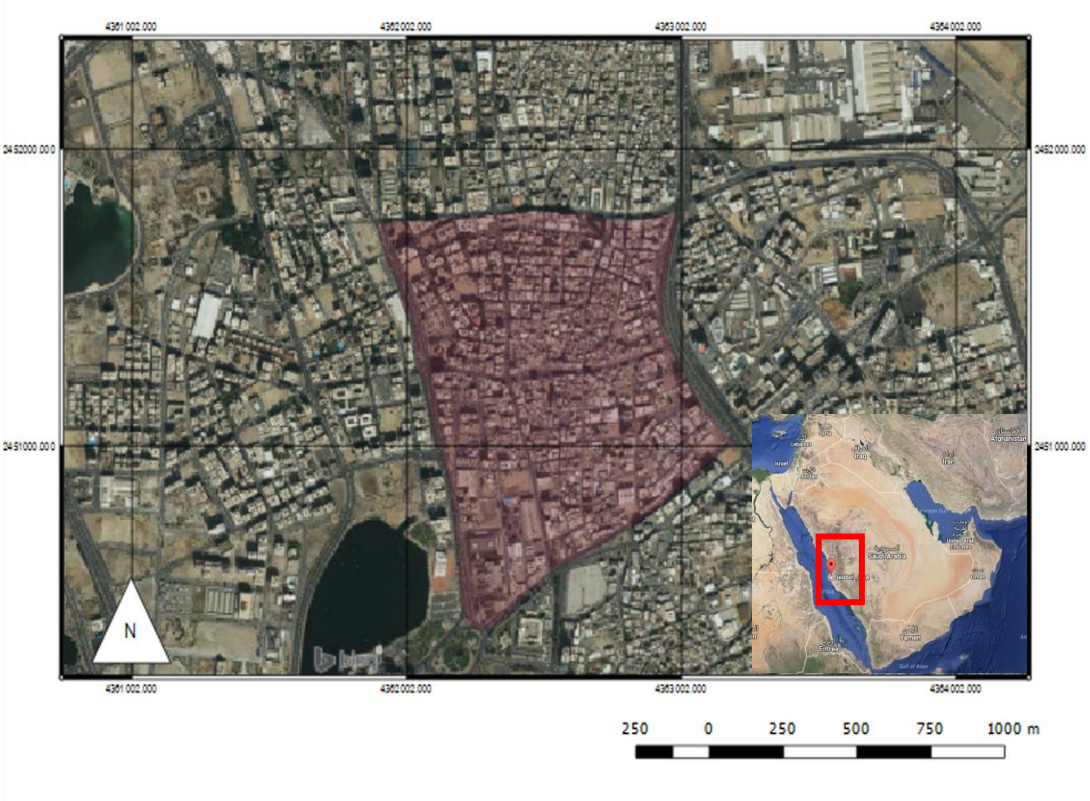

Figure 1. The map of study area (Modified from Google Earth)

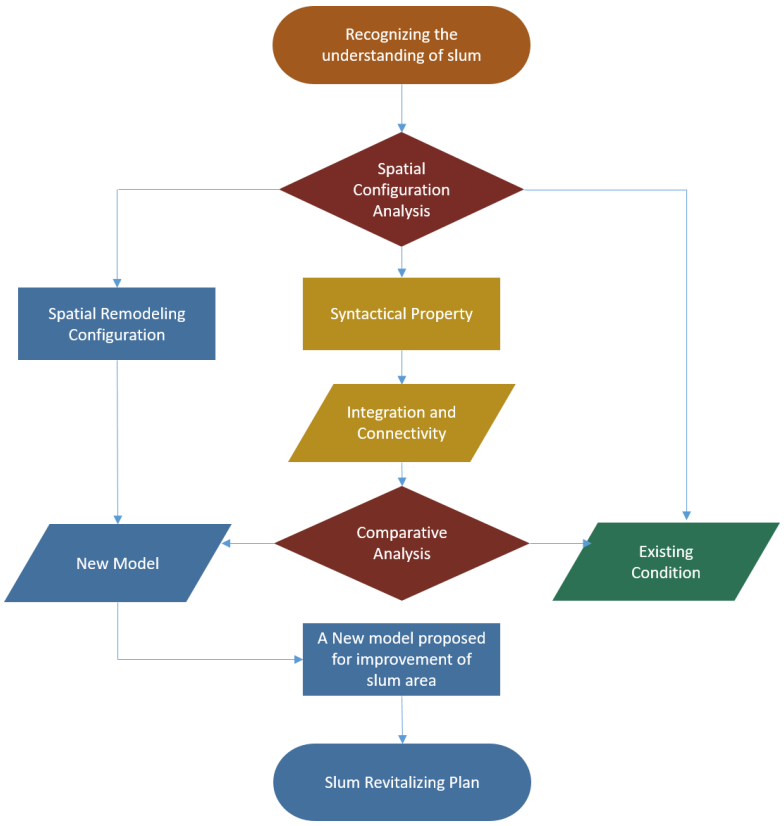

Figure 2. Flowchart of the study

2.3 Spatial re-modeling configuration

The relationship between the syntactical properties (integration) and movement (pedestrian & vehicular) as well as the land uses was largely corroborated in the literature of space syntax. It is adopted by the current research as the initial base assumption to establish a methodology to assess and develop the initial proposal of a contemporary design for Baghdadiyah. The most appropriate proposal is expected to attain integration of the urban axes and the new plan (Figure 2).

Baghdadiyah plan which represents its alley ways network was drawn as a geometrically closed polygon layout in DWG format, imported to Syntax2D 1.2 in a DXF format, then all-line-axial-map is automatically generated. This map was reduced to a fewest-line-map which covers the spatial system with as few lines as possible to let any part of the system to be seen from a line and at the same time ensure the minimized depth between all pairs of lines. The minimal version of the fewest-line map was selected rather than the subset version. It gives more natural image that approximates what was done by syntax researchers. Finally, an analysis was run to calculate the values of syntactic properties.

Two syntactical properties (integration and connectivity) were measured. The connectivity means to count deep all line up and obtain a property of the line that can be viewed in the system. It relates to many lines of intersection and located to the depth of the middle area. Connectivity measures the number of immediate neighbors that are directly connected to space.

Integration is the fewer intervening lines which needs to be passed through to go from a line to every other line (Hillier et al., 1987). In a more recent meaning, integration measures the distance from each spatial element to all others in a system (up to a certain radius and given a definition of distance) and so corresponds to mathematical closeness. According to this measure, the spaces of any spatial system can be hierarchical starting the maximum integrated (red axial lines) to the maximum segregated one (blue axial lines) (Klarqvist, 1993). The literature of space syntax stated that integration represents the to-movement potential of a space, and choses the through-movement potential, and points out also that the two measures correspond to two basic elements in any trip: selecting a destination from an origin (integration). With the purpose of discourse the problem of the slum areas, an unconventional spatial analytic methodology was established to demonstrate the most essential routes of the road or street in each of the settlements (Taki et al., 2017). The isolated and intensified core of the settlement was identified by local accessibility analysis. Based on the analysis, a plan was decided upon to realign and link the smaller fragments to the larger structure of city-wide routes.

3. RESULTS AND DISCUSSION

3.1. Identifying physical condition of Baghdadiyah

Baghdadiyah located on the east side of the red sea, is an area densely populated with a variety of backgrounds country. Most the dweller is middle class and poor. This area is surrounded by the main street transport; therefore, it is a strategic value of this area. Densely settlements are concentrated in the center of the area with smaller houses, while large houses are located on the sides of those areas. The streets network in this area is homocentric.

There are two main streets that intersect in the middle of the area, and each of them has small street branches (Figure 3). This small street indicates a very dense concentration of buildings with extremely narrow spaces between buildings that lead to the formation of small and much-branched streets. Many buildings in Baghdadiyah are old, unfit and bad categories, as shown in Figure 4 with a dark red color. They are mostly located in the middle area with a pattern of small and split form features. Some of the site blocks consist of small and densely buildings that are not neatly arranged while surrounding site blocks are neatly constructed buildings.

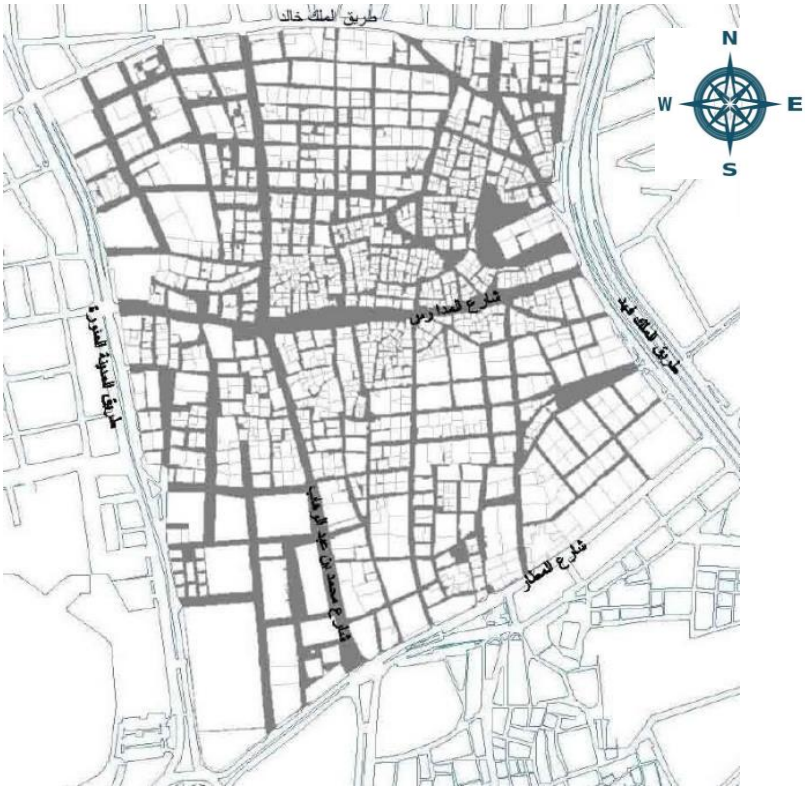

Figure 3. The streets network of Baghdadiyah

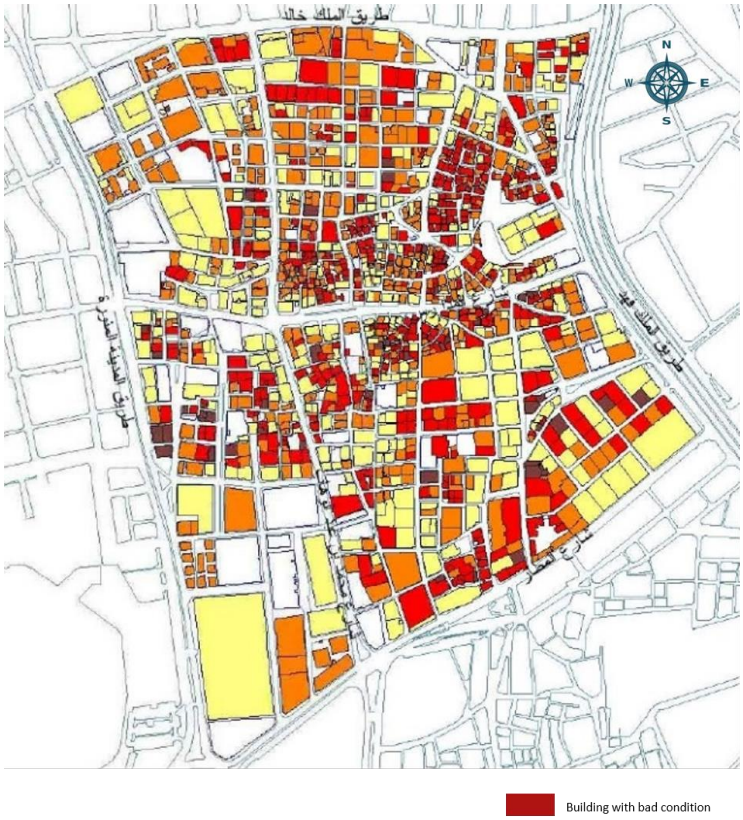

Figure 4. The building categories of Baghdadiyah

Overall land use at this location (Figure 5) was dominated residential areas (yellow color) with the location at the center of the area. Other land use such as commercial (red) was located along side of the

street, the open space and vacant, while warehousing, offices, and industry lied spread alongside the main street. The Figure 6 showed that many numbers of intervening lines or depth and the large numbers led to much space segregations, as shown on the identification of the circle. It shows the amount of space with categories slum. This location is a target and categorized as a slum area. Therefore, it needs serious attention to immediate revitalization.

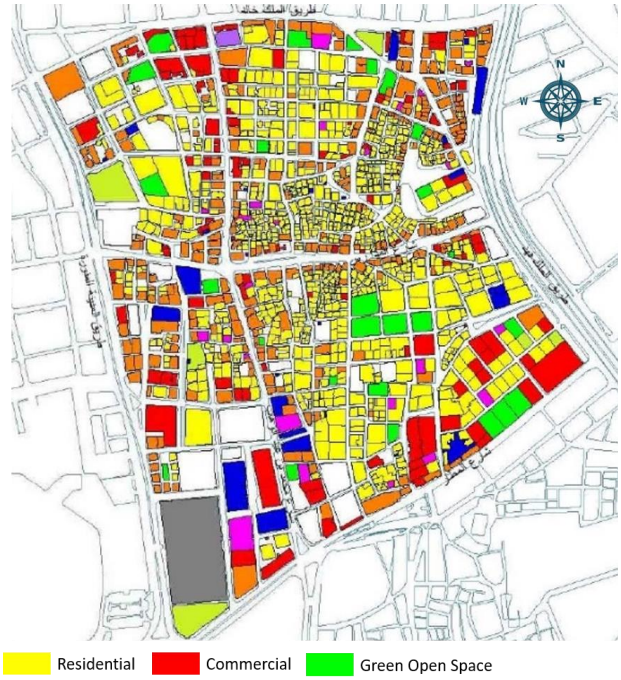

Figure 5. The land use of Baghdadiyah

Figure 6. The potential area to be revitalized in Baghdadiyah

3.2. Spatial configuration analysis of existing condition

Existing condition is the current physical form of the area consisting of the location structure among buildings and street network patterns. Understanding the existing condition is important to build the new or proposed model since it is expected to improve the quality of life. In this section, the syntactical properties (connectivity and integration) have been used as an analysis using space syntax technique.

The connectivity analysis of Baghdadiyah shown in Figure 7 revealed that the number of lines was directly joined with it. The connectivity was related to many lines of intersection and was located to the depth of the middle area. The red color representing lines or roads with good connectivity was only visible in the middle. As opposed, the other of the lines had blue color which means poor category of connectivity. The category of lines color was blue, green, yellow and red.

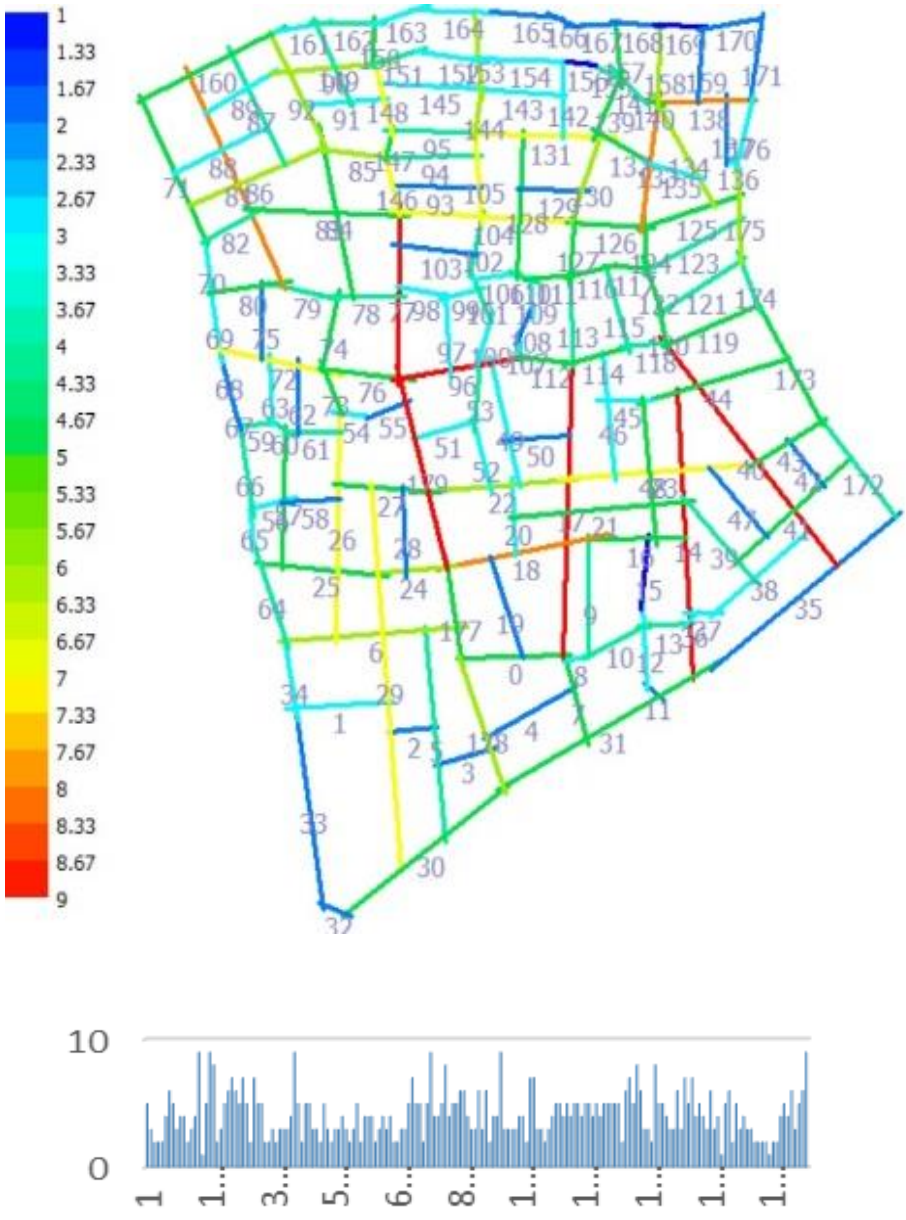

Figure 7. The connectivity of Baghdadiyah (Own Analysis, 2016)

Global image integration in Figure 8 showed that good integration is shown as a red line. By contrast, dominant blue color stated the poor area. The integration of poorly visible especially the area of the center where many lines are formed caused considerable depths and increase segregation in the system. Many blue lines on the edge, green and yellow lines dominated the whole area.

From the analysis of connectivity (Figure 7) and integration (Figure 8) of the existing area by deep or shallow in each line from other lines, it can be discussed that this area is categorized as a slum and soon need to be revitalized, especially in the central of the area. The enormous numbers of lines with dense and short distance were the evidence.

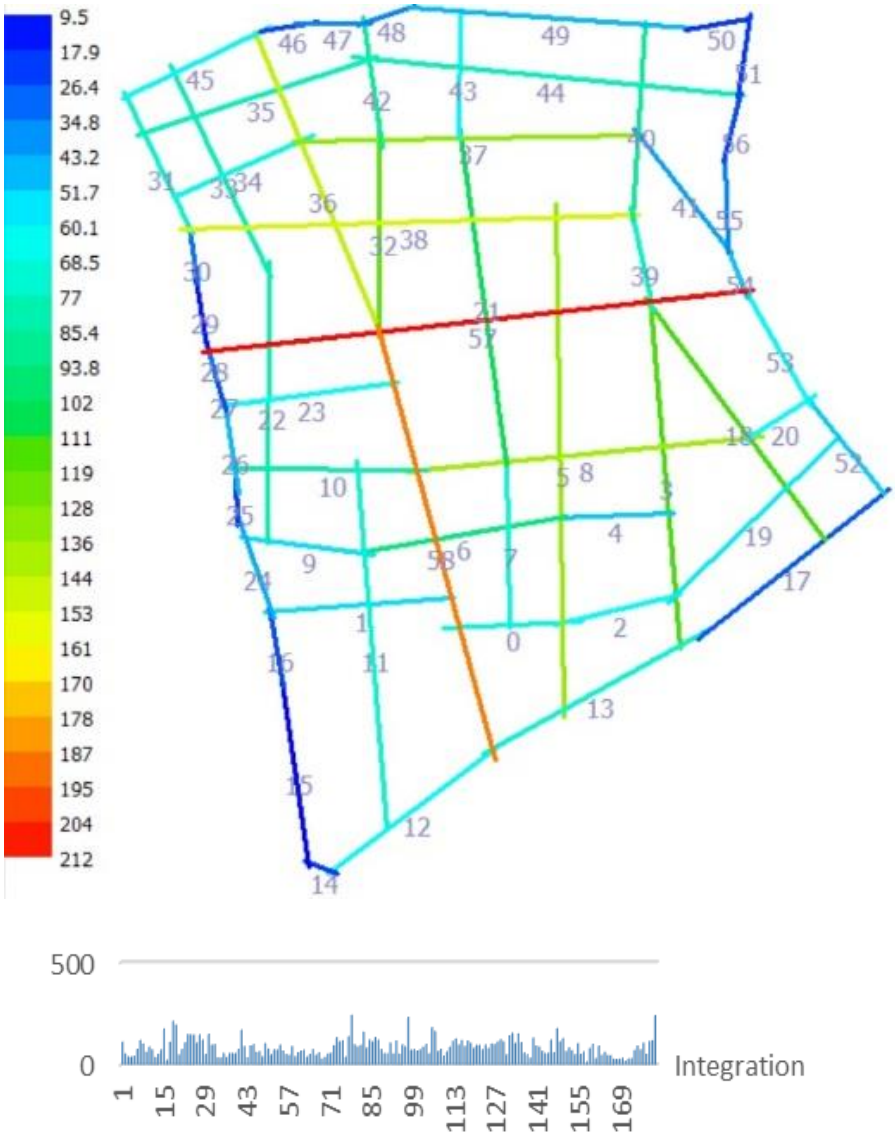

Figure 8. The integration of Baghdadiyah (Own Analysis, 2016)

3.3. A New Model for Slum Revitalizing plan of Badgdadiyah

The new model is a proposed design to replace the current condition. The new model is designed with the aim of reducing the very tight spacing between buildings as well as facilitating the movement of transport traffic by creating simpler street network patterns but is expected to enlarge the value of connectivity and integration. The focus of the revitalizing area is that the detected location has a low syntactical properties value and is proven by green and blue color lines in the result of space syntax technique.

Connectivity of new model is taken by line and network improvement and presented in the system. It is expected to increase the connectivity of new space. In the Figure 9, the reduction in the blue color as a

sign of poor connectivity appeared. On the contrary, closer to the red color, a sign of improvement especially overall connectivity area can be observed. Analysis of integration of the new models is expected to add shallow from the lines and on the other hand, can reduce the deep of all line. In Figure 10, there is an addition of red color lines in the middle of the street intersection, while the blue and green lines are reduced. This result marked improvement in terms of integration.

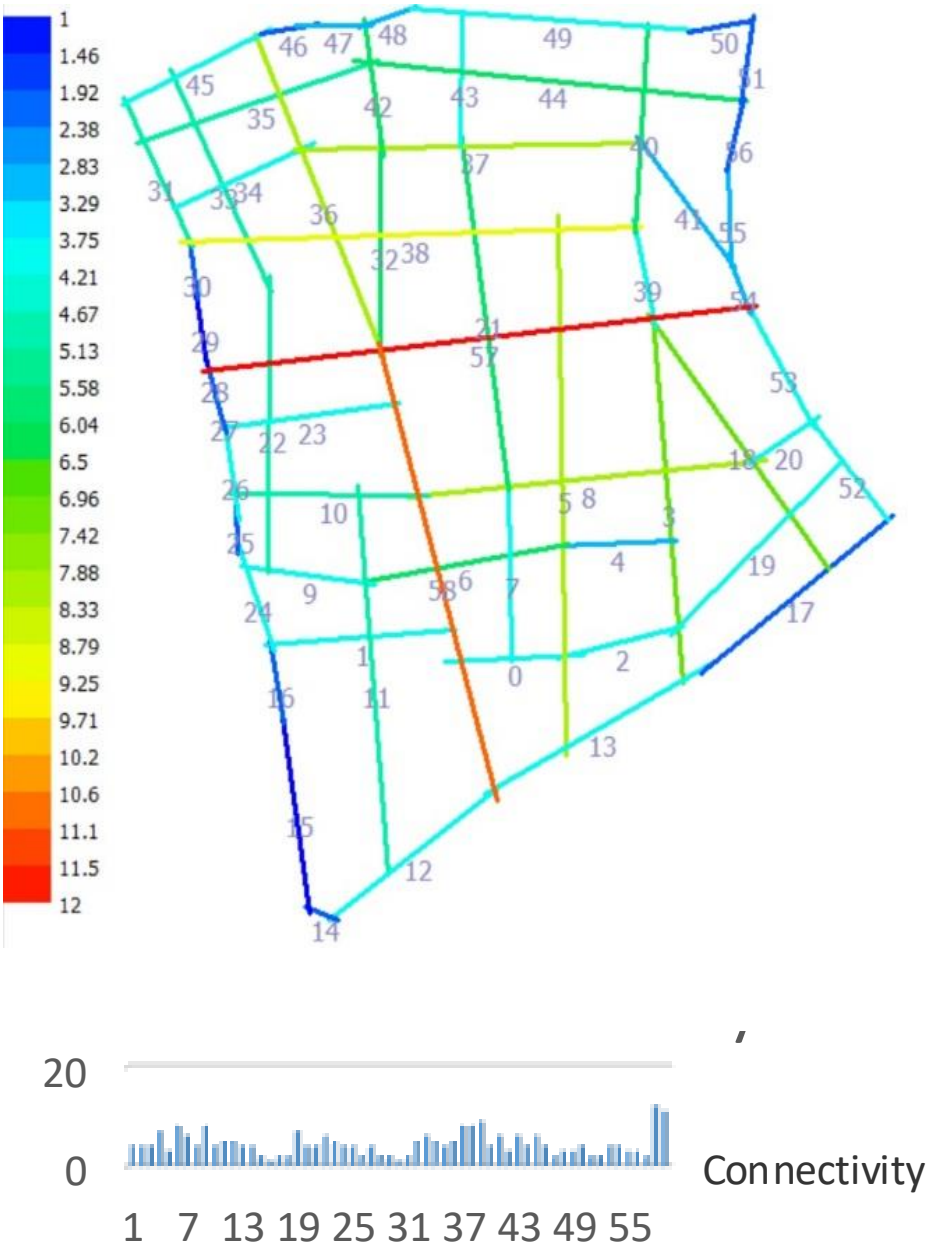

Figure 9. The connectivity of new model of Baghdadiyah (Own Analysis, 2016)

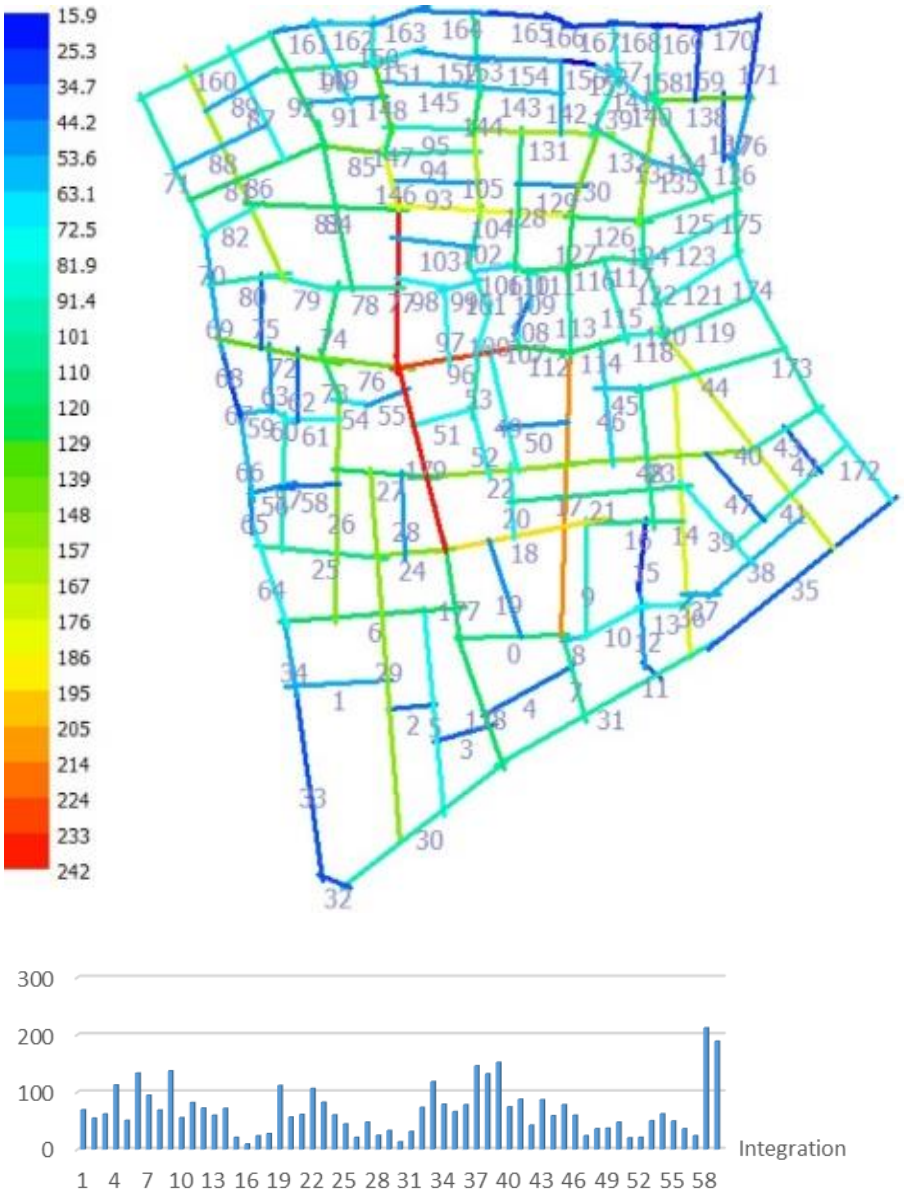

Figure 10. The integration of new model of Baghdadiyah (Own Analysis, 2016)

3.4. The comparative analysis of syntactical property between existing and a new model.

The final analysis step of this study is to obtain a full comparison between the existing condition (actual) and the new model (proposed). A comparative analysis was conducted by looking at the syntactical properties. In Table 1, a valuable difference in connectivity and integration based on average, maximum, minimum and standard deviation was shown.

Table 1. The syntactical property between existing (actual) and new model (Own Analysis, 2016).

Syntatical Property	Average		Maximun		Minimum		SD	
	Actual	**Proposed**	**Actual**	**Proposed**	**Actual**	**Proposed**	**Actual**	**Proposed**
Connectivity	4,189	4,441	9	12	1	1	1,790	2,299
Integration	68,353	86,453	242,405	211,939	15,868	9.5	43,036	42,686

A comparative analysis above states that there are differences of connectivity average between existing (4,189) and proposed model (4,441). It means that connectivity of the new model was better than the existing condition. The analysis of integration shows the actual average (68,453) and the new model

(86,453) in syntactical property. This means that the existing is narrower than the new model. In addition, this analysis is expected to make it more accessible.

Previous research that has specifically studied the slum area using space syntax techniques was performed by (Hernbäck, 2012). His research aimed to find the most significant physical differences between study areas that were proved to be the hierarchical nature of the street network. A clearer hierarchy in an unplanned area implies the space in which women are generally located at lower levels of public function. The regular street grid of the planned area resulted in a more equitable distribution of public functions. In this way, the built environment in unplanned areas reflects and reproduces gender relations in the use of public space.

Meanwhile, the result of this research showed the difference of synthetic properties between existing condition and new model where the syntactical properties value of new model was better than the existing condition. It indicated the expressive profit achieved through intervention slum revitalizing plan, in terms of integration and connectivity urban framework with buildings and streets. Moreover, the proposed street in the new model should correspondingly improve the interaction between buildings, which will be more connected, especially in areas where there was an economic and social gap. The recommendation of this study is that, this elaborated proposal for Baghdadiyah is not only to offer a relation between the buildings and streets with urban fabric but also to take this opportunity to reduce most of the city's problems, to bring the city back as a key element of space articulation.

4. CONCLUSION

The existing spatial configuration of Baghdadiyah is dominated by segregation because the depth of each line. In this spatial configuration, it is indicated by the presence of the slum area and the need to obtain immediate attention for revitalizing the area. The results of the comparative analysis showed the new model having more connectivity compared to the existing condition since the shallow is decreased and the deep is reduced. Also, the new model is dominated by integration. Since the integration value is increased, the deep among lines is reduced. Finally, a new model performs better than the existing condition. In addition, the new model is highly potential to be proposed to revitalize the slum area.

The intended benefits of this study are to eliminate the degradation quality of environmental, physical, social, health, and economic conditions, to improve attractive physical territory and the value of land, to guarantee the security of the land tenure, to prevent the fragmentation of non-Saudi inhabitants, to add inner infrastructure and to connect to the neighboring areas.

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