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THE ROLE OF URBAN PLANNING TO REDUCE CRIME
CASE STUDY – AL-KHMUS CITY - LIBYA

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THE ROLE OF URBAN PLANNING TO REDUCE CRIME

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A thesis submitted to the graduate school of science

by

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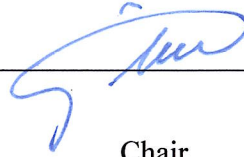
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DECLARATION

I hereby declare that, in accordance with academic rules and ethical conduct, all information in this thesis has been obtained and submitted. I also declare that, as required by these rules and practices, I have cited them in full, except in writing, as mentioned in the text and in the bibliography.



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April 2019

ABSTRACT

THE ROLE OF URBAN PLANNING TO REDUCE CRIME

CASE STUDY – AL-KHMUS CITY - LIBYA

In big cities, the expansion of residential neighbourhoods alongside with the increase in the number of people and the rise in the economic activities can lead to the increase of crime. This is usually relevant to weakness in traditional social relationship conviction. In spite of the essential and active role that the planning method of residential areas plays in strengthening of social connections between residents. In addition, this planning method gives the residents a sense of security, involving them in lowering the potential for criminal activities, and increasing the level of security within their neighbourhoods. This study discusses the role of urban planning in reducing the crime levels in AL-Khums city, Libya.

The study depends on the analysis of "spatial configuration" in street networks. "The spatial configuration" was implemented by space syntax theory, proposed by Bill Hillier. Whereas the spatial configuration analysis is studied the values of global integration, local integration and connectivity, the UCL DepthmapX software was implemented. The study them bolsters comparison between crime rates and space syntax, evaluating the correlations between each of the former values and crime rates, types and places of crimes occurrence. All of these correlations were analysed by SPSS (Statistical Package for Social Sciences. Version 25).

The research has shown that there is a strong relation between the crime rates and spatial configuration that has been measured through space syntax technique. The results of the study emphasize the significance of urban planning in reducing crime rates. In the light of these results, it could be stated that the effects of street network configuration should be taken into consideration in the future urban planning studies.

Keywords: Crime rates , Al-Khums city, Street networks, Space syntax.

ÖZET

KENT PLANLAMANNIN SUÇ ORANLARINI AZALTMADAKİ ROLÜ: AL-KHUMS KENTİ, LİBYA ÖRNEĞİ

Büyük kentlerde, nüfusun ve ekonomik faaliyetlerin artmasıyla birlikte konut alanlarının da yayılması, suç oranlarının artmasına neden olabilmektedir. Bu durum, planlamanın konut alanlarındaki sosyal bağları kuvvetlendirmede üstlendiği önemli ve aktif role rağmen, genellikle geleneksel sosyal ilişkilerin zayıflığı ile ilişkilidir. Bununla birlikte planlama, potansiyel suç faaliyetlerinin azaltılması ve güvenlik düzeyinin artırılması ile, kentte yaşayanlara bir güvenlik hissi vermektedir.

Bu çalışma, kent planlamanın suç oranlarını azaltmaktaki rolünü, Libya'nın AL-Khums kenti örneği üzerinden tartışmaktadır. Çalışma, AL-Khums kentinin sokak ağının mekansal örgütlenmesinin analizlerine dayanmaktadır. Mekansal örgütlenme, Prof. Bill Hillier tarafından geliştirilmiş olan Mekan Dizim teorisini esas almaktadır. Mekansal örgütlenme analizlerinde UCL DepthmapX yazılımı kullanılarak global bütünleşme, lokal bütünleşme ve bağlantılılık değerleri incelenmiştir. Çalışmada mekan dizim değerleri ile suç oranları karşılaştırılarak aralarındaki korelasyon, suçun türü ve konumu dikkate alınarak incelenmiştir. Tüm korelasyon analizleri SPSS yazılımı kullanılarak yapılmıştır.

Yapılan araştırma, suç oranları ile mekan dizim yöntemi ile ölçülen mekansal örgütlenme arasındaki güçlü bir bağıntı olduğunu göstermektedir. Çalışmanın sonuçları, suç oranlarını azaltmada kent planlamanın dikkate değer bir önemi olduğunu vurgulamaktadır. Bu sonuçlar doğrultusunda, yapılacak planlama çalışmalarında sokak ağı örgütlenmesinin etkilerinin göz önünde bulundurulması gerekmektedir.

Anahtar kelimeler: Suç oranları, AL-Khums kenti, sokak ağları, mekan dizim

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ABBREVIATION

| | |
|----|-------------------|
| C | Connectivity |
| Rn | Globe Integration |
| R3 | Local Integration |
| Km | Kilometers |
| Ha | Hectare |
| BC | Before Christ |
| AD | Anno Domini |



1. INTRODUCTION

The feeling of security is a social and psychological phenomenon that includes a diversity of variables. The sense of being secured is a result of individuals' immediate and non-direct ecological experiments and so various people have various experience. Anyway there is one essential point, which shows that the security and crime happening are one of the results of built environments. In fact, crime is a product of an interaction between the person and the place, crime rates have a significant relationship with economic factors and various social factors, for instance, education levels and rates of poverty and lack of social organization, as well as it is affected by the environmental structure. Not exclusively can comprehend crime occasions all the more completely by considering their settings, also, more knowledge can be gained about crime directions and manners. Crime does not occur equally in all societies. It is concentrated on some areas more than others and more than occasionally. In addition, the evolution and continued growth of the communities in major cities always secreted innovative types of criminal behavior.

1.1. Research questions

Research questions of this study has been defined as follows:

- Crime is threatening the life of the individual, especially in residential neighbourhoods. Are the street networks have a role that assists crime occurring?
- Does urban planning of residential areas have an effect on the spatial distribution of crime?

1.2. Hypothesis of the Research

The hypothesis of this study states that, crime within the city has a strong relationship with spatial configuration of the city.

1.3. Aim of the Research

The research aims to study the relationship between crime rates and the spatial configuration of the urban areas. The research also aims to increase the knowledge about the relationship between crime occurrence and urban planning and how to consider this knowledge in urban planning process. Also, this research aims to find a residential environment (virtuous) completely free of crime, even though it is not possible. However it is possible to reduce the opportunities for crime and raise the people's sense of security, through the application of architectural and urban neighbourhoods processors in design.

1.4. Methodology

This research has descriptive and analytical approaches in the process of data gathering and analysis. Also, this study base on analyzing spatial configuration of urban layouts utilizing space syntax technique. In this part, drawing the longest and lowest axial lines to get the axial map to Al-Khums city and analyzed through UCL DepthmapX software.

The crime rates were obtained from the municipality in Al-Khums city. It includes data on the types of crime and places of crimes occurrences. The study analysed street network patterns of Al-Khums city, by the spatial configuration using the space syntax technique to acquire spatial values of integration and connectivity. The correlations between previous values and rates of crime, and the correlations of all previous analyses are searched by SPSS (Statistical Package for Social Sciences. Version 25).

Methodology of this study can be summarized in 4 steps:

1. Definition of crime - literature survey.
2. Definition of spatial configuration – literature survey.
3. Date on crime in the case area.
4. Comparison of the two types of data.

2. DEFINITION AND CAUSES OF CRIME

2.1. Definition of Crime

Crime goes past the people and reaches to the open field, by principles or restrictive laws, which apply sanctions or legitimate sanctions with the mediation of a public dominion. The contrast between these two definitions is at the core of crime related issues. The law eventually characterizes what is and is not a crime. While popular definitions think about the law as a reality, sociological definitions address the subject in a progressively social manner, drawing attention not only to the act itself, but to the law itself and to whose interests it seeks to protect. It makes a uniqueness between private crimes, for example, personal issues or disputes and public crimes that offend a broader rule or social values. subsequently, criminologists look beyond this rigid lawful definition to check the social and cultural origin of crime and criminalization, including an approach under discussion about why certain activities are labelled as "crime" (Gordon et al., 2006).

Crime to understand, explicitly factors that reason crime, has been the point of convergence of specialists both in social fields and design for several decades. The prevalent theory of the spatial area of crime has been the social complexity theory. The three exogenous components of destitution, ethnic heterogeneity and racial, as well as residential mobility are speculated. The outcomes caused a withdrawal of the informal organization control exercises and extension in crimes, as in sociology. Furthermore, organize activity theory, the other essential theory in the detection of the spatial area of the crime, states that ill-conceived actions outcomes from offenders with specific drives, directed chances, and the absence of effective supervision. In the same context, previous studies have shown significance of appealing targets and lack of efficient supervision (Baran et al., 2007).

The theory of Urban design, additionally, has centered to the issue of crime. The experimental study about inside the design field is basically cantered around site-particular and situational highlights of the place. Beginning from the 1960s, some this group of researchers has underlined the environmental traits role in crime

avoidance. In 1961, Jacobs confirmed that the deliberation of people and rating about open space are noteworthy parts to the urban centrality, as well as casual (natural) surveillance (eye on the street) are decent obstructions to criminal movement.

Under the light of the audit given by Bennett (1989), situational measures work at three levels. In the first place, at individual scale, situational measures call for target solidifying and introducing cautions as well as observation cameras. The time is perceived as a risk by offenders in this scale. Secondly, at a community scale, neighbourhood watching programs have been actualized to include inhabitants in revealing suspicious activities. Researches to this date have not demonstrated whether this had an apparent hazard among crimes or not. Thirdly, at a physical domain level, situational measures depend on Jacobs and Newman's ideas of controlling walker and movement streams, territoriality, and characteristic observation. Jacobs trusted that through the occupation and utilization of space, occupants come to consider a specific space as theirs, and apply authority over it (Jacobs, 1961).

To a specific degree, it may be very well reasoned from the previously mentioned theories and prevention programs that offenders share four general concerns: how rapidly it takes to get to the objective, how rapidly it takes to flee, how much esteem the objective conceivably has, and how likely the crime is to be gotten while carrying out the crime or leaving the scene (Nubani and Wineman, 2018).

Past writings has likewise demonstrated that the three essential components for somebody to perpetrate a crime are capacity, opportunity, and motive. In this way, on the off chance that it could be indicated utilizing space syntax techniques which roads offer the chance to perpetrate a crime, at that point, it winds up simpler for police to know which streets to increase patrolling (Nubani, 2006).

2.2. Causes of Crime

The causes and motives of crime can be attributed to many factors. For instance, social, economic and environmental factors. These factors can be due to the biological structure of an individual and the biological regulations governing it in the context of criminal behaviour. According to the vision of a social school for criminal behaviour, the environmental factors represent cosmic phenomena and natural conditions play the main role in the increase in criminal behaviour (Ayed, 2004).

2.2.1. Social Factors

The factors of social are situations that surrounds a specific individual and characterize her from others. That individual can be subjected to certain social relationship and circumstances in accordance to certain type of individuals, such as family members, friends from school or from the surrounding community. In this concept, the social conditions here are constrained to a lot of connections that emerge from the individual and a specific groups of individuals (Abdullah, 2011).

2.2.1.1. Family

The first educational institution is family. Family is a set of persons bound link by means for solid relation and these individuals usually live in the same house with a lovely relationship, linking the father, mother, sons, daughters as well as other social relationships, on coherent basis and common interest aims. Family assumes a main role in making and setting up an individual to challenge complex issues of social, and in preparing for the inhabitation fitting for social roles in which she/he can give the administrations expected to the society (Abdullah, 2011).

The family functionality, has shrunk for the time being and turned a portion of its capacities to the general foundations and others outcome of the expansiveness of knowing, and the decent variety of notions and the assortment of ways and means. So, the inability of the family to do all of its functions, as a consequence of its specific capabilities and multidisciplinary, allowed the emergence of different sciences and new knowledge of life requirements, which no institution can offer (Abdullah, 2011).

The family is concerned in the members in various financial, religious, social, instructive and entertaining activities. Other different family functions include the provision of physical and health training for individuals through the family-based consideration and rearing of kids' physical instruction and health. It is important to highlight that the social hierarchy's vital role in breeding the individual in a family. The implication of this social hierarchy can affect the family's construction and functions. The family's role of "social control" has serious consequences on the future of the individual, in terms of psychological and social stability (Abdullah, 2011). It was emphasized which family performs an significant role in child

delinquency. Tension between the family members, and lack of cohesion leads to deviation and directs to crime (Al-Shdaifat and Al-Rasheedi, 2016).

2.2.1.2. School and Education

According to its tasks and duties, the school is an institution can protect children and youths and prevent delinquency. As the school requires to conduct educational tasks to the fullest; the basic function of education is to communicate knowledge and skills, which contribute to the consolidation of desired values. The educational system, faces to the past by transferring heritage of cultural to the learners, faces to the future by developing experiences, skills and social behavior. The school is the most significant external environment factor, impacting the event and learners' behavior in school, the relation between teachers with students, as well as the educational type of recreational programs (Ayed, 2004).

The school plays a vital role, in leading the society to the stability and maintaining this stability. It is one of the important social structures that carry standards. It does not only to provide the individual knowledge, but also performs a main role in the breeding of children. It is a safe environment for prevention of deviation, through many activities such as supervision, promotion of good behaviour, and confirm laws, rules and instructions to maintain behaviours (Al-Shdaifat and Al-Rasheedi, 2016).

2.2.1.3. Residential Environment

The majority of the social searches concentrated on the case of crime, emphasize the significance of the residential environment in accordance with the process of criminality. The house in which the person lives has a significant function in this field. This means that the house residency is the standard morphological characteristic that makes up the structure of the housing unit for a family what's more, it additionally assumes a reasonable job in the field of attachment and the dismantling of the family (Ayed, 2004).

Individuals acquire their values, habits and behaviour characteristics from people living in the same residential environment, and this became the impact that mainly effect the social nature of the human beings in this life. Moreover, individuals depend on other group of individuals to satisfy their needs, and as a consequence to acquire their skills and experience. The residential environment has a clear impact on the appearance of crime in individuals and groups, and that can be due to a set of

physical and environmental realities of the surrounding environments (Al-Shdaifat and Al-Rasheedi, 2016).

2.2.2. Economic Factors

Crime and changes in the framework of crime are both influenced by many components, such as the level of financial improvement, and the socio-political framework. Those capacities in a given nation, with the advancement of industrialization as well as urbanization, changes the social structure, which is age-related with individuals from the general public. The individual will carry out an offense if the normal benefit coming about as a consequence of the criminal conduct will be higher than the benefit coming about as a consequence of the engagement in its legal alternative (Pieszko et al., 2016).

2.2.2.1. Unemployment

There is a link between deviant behaviour and diverse economic conditions in communities containing unemployment and poverty. This forces the community to the imposition of laws to protect the economic framework as well as to the imposition of penalties for violators, leading to the emergence of new crimes. The relationship between the financial and social factors are alike in unemployment which is regularly associated with the low salary, and may drive the family deviant and criminal behaviours at the turn of poverty. In explanation of crime economic advocates believe that it is basically due to poverty, and it is the result of reduced or low salary, and it is the outcome of unemployment. Poverty is an environment in which every opportunity to commit a crime is prepared. The relationship between unemployment as well as poverty, on the one hand, and the relationship between poverty and criminal behaviour, on the other hand. Poverty has a main role toward the path and the perpetration of criminal behaviour. In addition, poverty is already known to be the motive for the crime (Harwaz, 2015).

While unemployment is frequently utilized as a key pointer in the investigation of the impact economic conditions on crime, formal unemployment alone cannot be a complete sign of the state of the money related emergency itself, or dimensions of populace budgetary pressure. In addition, notwithstanding the loss of work, the money related emergency may likewise show itself through lessened government social consumption, an expanded expense of fundamental shopper merchandise, or

confinements on neighbourhood credit accessibility. Any one of these may outcome in budgetary worry for individuals and society, with no adjustment in formal unemployment (Malby et al., 2006). Very few individuals, confronting extreme monetary issues, may not consider turning to crime and may even seek more desperate solutions. Criminal opportunity recommends that in the meantime pressure could give motivation to carry out the crime, like decreased levels to economic production, utilization related with a financial slowdown, and expanded concentrations of unemployment (Cantor and Land, 1985).

2.2.2.2. Residential Condition

Communities suffer from a severe housing crisis as an outcome of the inadequacy of the old housing for the expansion of the increasing number of family members, as well as to the surrounding life of personal and social circumstances. The housing is considered appropriate where all the proper conditions are available. Inappropriate housing can be the motive for the crime and delinquency, and can cause severe damage to the family in general, for younger family members in particular, on physical and/or psychological terms (Abdullah, 2011).

Correspondingly, congestion and lack of space lead to fatigue, tension, conflict, and the desire or decision to escape from the house. The ongoing conflict among family members due to lack of understanding and respect may force the child to go out into the streets in the absence of parental control. In poor housing, lack of entertainment is the motivation for young individuals to escape to the streets, cohabitation with bad companions, and exposure to corruption as well as deviation, assist in the prevalence of crime, and increase the chances of crime prevalence among adolescents (Harwaz, 2015).

2.2.3. Environmental Factors

Environmental criminology assumes that several individuals are criminally motivated and focuses on the criminal occasion instead of offender stimulus. The objective of environmental criminology is to deal with patterns in time as well as place and how crimes occur, utilizing the geographic imagination in order to describe, understand as well as control criminal events (Abdullah, 2011).

2.2.3.1. Urban Planning

The fast pace of urbanization combined with the development in city size and density is related to expanded crime and viciousness. Poor urban arrangement, planning, as well as poor administration has a role in molding of urban situations that put nationals and property's in danger. The texture and design of urban areas affect the increase of criminals, unfortunate casualties, and opportunities for crime. The families situated in zones encountering elevated amounts of development will probably be more deceived than those in communities with the stable populace. In this manner, city development is viewed as an exceptionally solid factor on crime rates. The effects of fast urbanization likewise stretch out past direct exploitation. Accordingly, fast advanced places expanded weight on the specialists to meet open security and wellbeing requests. Poor urban planning, and administration have progressively been referred as a job forming urban conditions that put natives, and property in danger. Along these lines, the physical texture and format of urban areas have an orientation on the normal development of guilty parties and exploited people on opportunities for a crime. Viable urban planning, and administration should try to control the built environment condition in ways that diminish or even dispose the chance to carry out violation. The absence of integration of crime counteractive action techniques inside thorough city planning practices are factors in encouraging opportunities for urban crime (crime and violence at a glance, 2007).

During the 1960s, analysts have attracted to the connection between crime and the built environment. The book of Jane Jacob's "The Death and Life of Great American Cities" (Jacobs, 1961). was the main persuasive work to recommend that an active street life could chop down crime. She concentrated on the function of that "eyes in the street" in keeping up social control. Jacobs' thesis basically propose that the individuals, not the police, are the gatekeepers of the general population space (Adela et al., 2015). Criticism matched with the physical design of America's urban area, which confirmed skyscraper apartment structures isolated by open space with no specific trusteeship. Office zones that ended up empty after supper, prompted a suspension of casual observation, and a decrease in the feeling of social relationships among inhabitants. As indicated by Jacobs, city roads were risky in light of the fact that they were abandoned (Jacobs, 1961). Referring to Greenwich Village in the New York City, as an instance of an energetic urban society, and argued how utilized

avenues will probably be protected from genuine crime. She has discovered that common reconnaissance was basic for the sentiment of security, and that could be accomplished by expanding the number of individuals utilizing a specific territory through empowering an assorted variety of employments and opening doors for positive social communications (Jacobs, 1961).

Oscar Newman studied "Architectural Design for Crime Prevention" in 1971, and his book "Defensible Space, Crime Prevention through Urban Design" in 1973 (Newman, 1996). He contended that a zone is more secure when individuals feel a feeling of ownership and obligation regarding that as a piece of the society. He studied crime rates in low- lodging ventures in New York City. He viewed the advancement of an eleven story, 2740 unit open lodging complex, named "Pruitt-Igoe". The Pruitt-Igoe should be a perfect lodging society for low pay families. The musing was to keep the grounds and the fundamental floor free for society activities. Each building was given basic lobbies on each third floor to house clothing, a shared room, and a waste room. The outside territories of each building were additionally basic regions. As for Newman, since every one of the grounds and basic zones were disassociated from the units, inhabitants revealed no responsibility toward those units and accordingly they became insecure. The hallways, anterooms, lifts, and stairs were unsafe spots to walk, they became covered by wall writing and painting and scattered in the waste and human garbage, and ladies needed to get together in groups. The venture never accomplished over sixty percent inhabitance. The complex failed dreadfully and was destroyed for around 10 years. Nonetheless, over the street from Pruitt-Igoe was a smaller, older, row-house congregation occupied by a similar inhabitance called "Carr Square Village". It continued completely occupied and trouble free all over; with the social elements steady in the two improvements, Newman started at exploring physical elements were diverse among the two complexes that would empower one complex to flourish while while the other must be torn down. One of the main things Newman also take into consideration was building type (Adela et al., 2015).

2.2.3.2. Land Use

The internal formats, limit qualities, and traffic patterns of neighbourhoods may energize or demoralize distinctive sorts of crime. By suggestion, changes in land use, limits, and activity examples may outcome in higher or bring down crime rates since they influence both potential guilty parties as well as clients. They might modify exposure to possibility guilty parties because they pretty much incorporate the place into the guilty tropics of activity (Taylor and Harrell, 1996).

At the neighbourhood level, planners classify the relevant structures into undertaking producers, for instance, high-volume roads, attractors and non-residential land uses, for instance, shopping, that will attract outsiders. Movement generators cause additional individuals moving through a residential locale; attractors as well as non-residential land utilize to generate extra individuals traveling to a residential locale. Cross sectional as well as linear doings both recommend solid relations among these material requirements as well as crime levels. In Atlanta, it was initiated that the interior planning of low crime neighbourhoods were less penetrable increasingly single direction, narrower, and lower volume roads than those found in higher crime neighbourhoods (Taylor and Harrell, 1996).

An ongoing report inspected the impacts of the physical condition on crime changes. The level of rate percentage zoned for commercial use was a noteworthy indicator of the expanded danger of high criminal's rates in Washington. However, the nearness of open lodging units, found in many enumeration tracts in Washington, was not out and out related to changes in neighborhood danger of theft, Robbery in those zones. Longitudinal research in Hartford and an unpublished appraisal in Miami recommend that physical changes to inside dissemination examples and limits were trailed by down crime rates. Planners have routinely worked with neighborhoods the nation over to examine their crime issues and to decrease them by making physical adjustments (Taylor and Harrell, 1996).

Whilst the street network effects the courses that individuals take from roots to purposes, it is the region of people's movement hubs that figures out what these descent and aims. Some activity hubs will be particular to a person, while others will be shared by mean of many. A few non-residential spaces observed with the spatial

dissemination of rough crimes. Nevertheless, the spatial distribution of savage crime has likewise been observed to be connected with recreational and commercial land uses even more generally. They may apply an effect on the likelihood of crime event that outperforms any commitment that might be related with the impact of the street network on motion flows. On the other hand, and in the extraordinary, the area of recreational and commercial land uses instead of the configuration of the road network to a great extent may clarify movement flows (Summer and Johnson, 2017). Nonetheless, in 2007, Hillier has proposed that it is the impact on vehicular and pedestrian motion of the street network that styles the dissemination of land uses, instead of the other roed round; as follows (Hillier, 2007);

"far from explaining away the relation among the grid structure and movement by pointing to the shops, we have explained the location of the shops by pointing to the relation among grid as well as movement".

Obviously, in light of the fact that a segment has a high ability of containing confirmed land uses as a consequence of its situation inside the road network, this does not imply that it is fundamentally figured out. As such, to correctly evaluate the autonomous impact of the street land on spatial crime distributions, a land that utilizes this measure is joined into the checking (Summer and Johnson, 2017).

2.2.3.3. Street Networks

At the road scale non-residential land uses and high motion extent may intrude with inhabitants' ability to supervise activities on the block, and to identify people who have a place with the neighbourhood. More elevated amounts of pedestrian activity, can be regularly connected with close-by business or institutional land uses. Non-residential land uses and higher vehicle and pedestrian traffic levels create linked to it more troublesome. Inhabitants become more acquainted with each other and recognize authentic clients of the setting as potential offenders. Such elements can be comprehended with regard to inhabitant based regional working. In short; non-private land utilizes make gaps in the texture of occupant founded casual control, and higher traffic or passer-by volumes contract the geographic scope of inhabitant based casual control (Taylor and Harrell, 1996). There is also evidence on the relation between street patterns and the frequency of crime (Unlu et al., 2004).

The possibility of a connection between streets and crime rates has been around for quite a while. A few have noticed how the criminal zones in London of nineteenth-century were purposely separated over the position of new roads as a component of a more broader program for slum, and the development of traffic movement confirmed that high streets, railroads, and tramways scatter ruthless groups in provincial locale, similarly as wide street [prevent] theft with brutality, covering of stolen products, as well as indecent assaults (Beavon, 1994).

However, the coming of p preferable transportation networks has not in every case generally matched with lessened measures of crime. For instance, it is discovered that the highest crime rates for middle-sized cities in Suffolk in the middle of the nineteenth century occurred along the major expressways. This is by all accounts a typical wonder even today. Several researchers have established higher rates of crime on or nearby main traffic. Besides, public transportation frameworks focus individuals (included prospective criminal) close prospective concentrates for wrongdoing (included staff and travel riders) at travel stops and nodes (Beavon, 1994).

The crime creating and crime diminishing prospect of street network frameworks and their related land utilizes were, generally, overlooked by mean of social researchers and urban coordinators about for 50 years. Appleyard Lintell attitude an audit in the mid -1970s, grumbled that "investigations of urban roads have concentrated just on increasing their traffic ability with no parallel describing of the social expenses and environmental". In the results of a research on "liveable street", Appleyard (1981) inspected inhabitants' perspectives about local crime issues, yet he did not look at genuine crime patterns. Truth be told, much modern planning will, in general, view the activity as shrewd and follows an anti-urban prejudice, frequently connected with Wirth (1964), in segregating streets with vehicles from pedestrian paths (Beavon, 1994).

In 1961, Jacobs was the first contemporary urban planner to develop a theory relating the crime to streets, and this was just by mean of derivation. In her theory of crime domination, she unequivocally illustrated three subjects. Initially, Jacobs focused on the fact that a reasonable qualification must be made among open and private spaces. Secondly, depending on the reality that many crime happens in broad daylight space, Jacobs underlined the requirement for casual observation of area. She

contended that residents must become watchful and transform into "the eyes of the street". Third, she trusted that regions with few individuals around will, in general, endure more crime there are no observers. Thus, Jacobs focused on that urban areas ought to be arranged so that there is constantly moderate action out in the open zones, for instance, streets, parks and walkways. She did not, however consider the parts of land uses and street networks in forming criminals determinations of goals. Most of the time, she did not consider the behaviour of criminal offenders innocent. In 1972, Newman was explained the concept of the possibility that road design could impact crime. He demonstrated that the current texture of city roads can be divided with the goal to make them regionally characterized units. As the regional subdivision of streets in an area extends, the inhabitants can all, the more likely, perceive intruders who do not have a place in the region. The regional subdivision is additionally prone to build the regional defence of individuals who do have a place with the regional subdivision. One part of an expansion in regional conduct is an expansion in reconnaissance. The two phenomena, Newman contended, will add to a crime reduction (Beavon, 1994).

2.3. Measuring Urban Planning through Space Syntax

Space syntax is a study approach that was advanced by means of a team led by Bill Hillier in University College London at the department of Architectural Studies (Hillier, 1996; Hillier, 1984). It is a tool for analyzing and describing the connection between spaces of buildings and urban areas. Ever after, it has developed into an independent research region with a mounting international community. Basically, space syntax is a program for exploring spatial complexes trying to recognize its specific framework that establishes at the level of the whole configuration. The program depends on the theory that the function connection in buildings and urban communities passes into the structural properties of its configuration. Space syntax is helpful in depicting and analyzing types of design of space, at building and the urban levels. Such portrayals of spatial configuration at that point fill in as independent factors in different sorts of architectural research (Hillier, 1988). Space syntax structure is a valuable technique which helps to investigate the relationship between urban configuration and human motion, likewise, further for increasingly specific aim. Some model elements of space syntax structure is utilized for urban community

contain way-finding, pedestrian forming, criminal mapping, etc (Hiller, Hanson and Peponis.1987).

2.3.1. The Role of Urban Planning on Distribution of Crime

A major collection of design explore has considered the relationship between the happening of spatial configuration and criminal events as estimated by mean of space syntax techniques. Established in diagram technique and the concept of urban morphology, space syntax technique describes and measures quantitatively the configurational properties of urban planning (Hillier and Hanson, 1984). The theory expect that the built environment, observed as a framework, manages or conveys motion from one space to each other space inside the framework. Environments that are most straightforwardly connected to various environments (high on integration and connectivity) will in general draw higher densities of motion. Observational study has generally supported this opinion by mean of demonstrating that regions with high syntactical accessibility have a higher number of vehicle utilizers as well as pedestrians (Hillier et al., 1998).

Space syntax theory is additionally significant to one of the social theories of the spatial region of crime, which is "routine movement theory". Some part of that theory suggests to the accessibility of potential unfortunate casualties for individual and space, as an opportuning to persuade criminals. Sociology studies that have attempted to discover association among crime and accessibility from a normal movement theory point of view have accessibility either as the number of turnings into a street or as the number of access streets from traffic arteries to those regions (Baran et al., 2007).

Most of the space syntax study have found that crime, specifically property crime in segregated areas, especially in those encased bunches, was viewed as the approach to grow local observation and subsequently to except causal interruption by mean of non-residents. Confirms that if the spatial configuration creates the regular motion of pedestrians more hard, there will not be a sufficient number of people to make the impression of an all-around allowed just as the utilized area. Experimental study has bolstered this notion by mean of presenting that spaces higher accessibility will in general have lower rates of crime, than spaces with low accessibility (Hillier, 1988).

Isolated spaces have higher rates of crime. The results of these studies are in agreement with the views of Jacobs (1961). Nonetheless, not all space syntax study look into has maintained these discoveries. The contention among the discoveries, to a particular degree, is the result of contrasts in units of examination utilized in the researches, and the inhabitants of way of life in the researche areas. Furthermore, contrasts in types of crime examined have added to the inconsistencies in the studies discoveries. In addition, point to the reality that the connection among space configuration as well as crime happening is an intricate issue (Baran et al., 2007).

2.3.2. Relation between Spatial Configuration and Crime

The term spatial configuration is utilized to allude the framework of potential motion and co-nearness as defined by the situation of bounders in the space, and by the relations and separations among regions that outcome from the existence of bounders (Pourmohammadi et al., 2013). Spatial configuration, in this manner, not just links with the existing different various hierarchical relations, yet in addition helps in creating specific styles of the relations of social. Spatial cofiguration, basically characterized at the same time as relationships of existing, is around the structure of the constructed form of the parts that are in an one of a kind association to one other Space syntax contends, in addition to different things, that urban spatial configurations have relatively framed associations with motion (particularly pedestrianism), which influences urban densities and land use patterns. In the previous period, a major collection of design study is done to commit to the connection between the event of criminal events as well as spatial configuration. In such studies discovered connections between proportions of Space Syntax, and crime in residential districts. Space syntax, in actuality, occupies certain basic rationality measures in diagrams, and first theorizes them with regarding their capability to epitomize or transmit social thoughts, also, afterward transforms them to portrayals and measures of the spatial cofiguration by means of connecting them to geometric portrayals of the arrangement of action of spaces under checking (Pourmohammadi et al., 2013).

As such the crime in previous space syntax studies, two parts of land use and motion with the goal to prevent crime have been featured: the co-nearness of pedestrians on the road, and the constitutions of a road: a road "protected" through continuous, on

the other, many residential entrances as well. The theory extends a scientific rationale in which spatial interface with social data, for instance, connections among the flow of vehicular, pedestrian movement and crime in urban regions. A central aim is to reveal the shrouded styles as well as structures inside spaces. In view on accessibility of sufficient computational instruments, the characteristic of space syntax way enables us to calculate the connective level of accessibility for each street segment in connective to the entire, or to its environment, for a whole city street network. Most by far of the space syntax studies considers has demonstrated that crime in private ownership, tends to group in isolated districts, particularly in those "un-constituted encased groups which Newman supposed as the approach to expand neighborhood observation and along these lines to maintain a strategic distance from causal interruption by non-inhabitants". In 1988, Hillier contends that if the spatial configuration creates the common motion of pedestrians progressively troublesome, there will not be an adequate number of individuals to produce the realization of an appropriated and utilized space. Observational study has upheld this idea by mean of demonstrating that places with higher accessibility will in general have lower crime rates, while areas with low accessibility, separated areas, have higher crime rates. These researches discoveries additionally affirm Jacobs, 1961 views (Pourmohammadi et al., 2013).

In 2004, Unlu, et al, The study's discussed the relationship between the concept of crime and street patterns of two areas situated in downtown zone of Istanbul (Beyoslu). These districts have historical and architectural. Both districts are located around a main shopping and amusement area and both districts have a main artery fringe that separates the mentioned area from the housing groups. both districts have commercial unity dispersed into the housing blocks. The axial analysis of space syntax has been connected to the chosen neighborhood, the analysis appeared the most integrated lines and separated areas in both districts; the report also emphasized an important result that the first and secondary degree arteries are implying higher integration values, whereas lower values of integration in depth analysis. The second stage of the research is conducted to elaborate outputs of axial line analysis. All streets from both districts have been taken into consideration for crime and street interaction analysis. The third stage of the research is composed of crime frequency analyses of the year 1998. The severe crime types such as homicide, injury,

usurpation, robbery, and, etc. Also, to sum it up, these results identify topological characteristics of urban neighbourhoods and they reflect the latent aspects of life in the city. However, that gives us clear outcomes that crime indeed has a relation to street patterns and the built environment (Unlu et al., 2004).

2.3.2.1. Integration

Integration is a static inclusive measure. Characterizes the average depth of a space for all other spaces in the system. The spaces of a system can be classified from the most integrated to the most separated (Hillier, Bill et al. 1987). And it measures how many curves must be made for a street to other routes in the network, using the shortest routes. On the number of turns needed to obtain all the data in the graph that is analyzed, it is said that the analysis measures the integration to the radius "n". The first intersection requires only one turn, the second two turns and so on. The road that requires the least number of laps to reach all the others are called "more integrated" and are usually represented with hotter colors, for example, red or yellow. The integration can also be analyzed at the local scale instead of at the scale of the entire network. In the case of radius 3 for example (Hillier and Hanson, 1984).

Integration, as well as availability, is a variable that is based on how a space is connected to other spaces in its environment. This is the key parameter that allows us to understand the existing relationships between users and the urban space and is a global measure. It can be used to predict the potential of spatial gatherings, since it is directly related to the presence of individuals in a particular place. The greater integration of space, the more people will use it (Hillier, 2007).

Global integration is a measure of integration, measured throughout the system. It takes into account the distance from the starting point to all points in the system. (Hillier and Hanson, 1984). The more integrated the space is, the more individuals will appear in that space. The correlation between the global availability of space (global integration), and the local availability of space (local integration) is the readability and clarity of the space (intelligibility). The better the correlation between these measures, the better the user moves along a given axis in space and knows where it is in the context of the entire city (Hillier, 1996). The spatial representation is constructed in such a way that it allows its use and processing in the depthmapX computer program. Syntactic measurements and numerical results allow conclusions

to be drawn about how space works. It is likely that a very isolated space characterized by an integration measure increases the risk of crime. Through this observation, it is possible to diagnose how to improve the quality of this space. The remodeling of the system, for example, a change in relations in space, generates changes to tackle the problem and predict how the new designed space will work. The results of the analyzes are offered in an understandable way. The way in which a problem is illustrated shows the cause and the solution, and is suitable for statements through public consultations (Hillier, 2007).

Local integration is a measure of local integration, which shows the level of pedestrian movement. Its calculation takes into account the elements of the degree of distant depth equal to 3. The distance can also be taken as a radius anchored to the starting point of approximately 1250 m. For local integration, measurements should be taken at a distance of 5 syntactic steps (Hillier and Hanson, 1984).

2.3.2.2. Connectivity

Connectivity measures the number of instantaneous neighbours that are directly connected to a space. This is a static local measure (Hillier and Hanson, 1984). It is a simple and useful measure for the axial map in space syntax. It refers to the number of lines connected directly to a line. In general, it is assumed that lines with high connectivity values are more popular than other lines and are supposed to attract more traffic. Based on this thinking, human movement styles can be predicted to a specific extent (Xiaolin, 2013).

In addition, the connectivity measures of direct access to lines and points of the same elements that are immediately adjacent to them connect directly with them. More appropriate distance measurements, even if this adjacency is taken into account, are based on indirect relationships between the elements of the system. The usual way is to calculate the shortest routes between the elements, therefore, computing the associated out-degrees and in-degrees which supply measures of accessibility or potential (Hillier, 2007).

3. INVESTIGATING THE RELATION BETWEEN URBAN PLANNING AND DISTRIBUTION OF CRIME IN AL-KHUMS CITY-LIBYA

In this section the case study is introduced, and data gathering and analysis are explained. The study depends on the crime rate that was obtained from the city's municipality in the case study. It includes data on the types of crime and places of crimes occurrences. The study of street network which is mainly concerning the analysis of spatial configuration in accordance with Space Syntax technique using UCL DepthmapX software, including: analysis of the values of integration and connectivity. This study also searched correlation between the crime rates and street network analyses by means of SPSS (Statistical Package for Social Sciences, Version 25).

3.1. Case Study: Al-Khums City

Libya is located in North Africa on the coast of the Mediterranean Sea. It limits to the east with Egypt; to the south of Sudan, Chad and Niger; and to the west by Algeria and Tunisia. The total area of Libya is 1,759,540 square kilometers of land. Libya borders Algeria (982 km), Chad (1,055 km), Egypt (1,115 km), Niger (354 km), Sudan (383 km) and Tunisia (459 km). The total length of the Libyan coast is 1,770 km in the Mediterranean Sea. The territorial sea of Libya extends for 12 nautical miles and up to the closing line of the Gulf of Sidra of 32° 30 'to the north (Figure 3-1) (Library of Congress, 2005).



Figure 3-1 Location of Libya (Url-1)

Al-Khums City is located in the north-western part of Libya on the coast of the Mediterranean Sea to the East of the city of Tripoli 120 km, to the West of the city of Misurata 90 km. Geographical coordinates, Latitude 39 32 North, Longitude 16 14 East. The city is located on the Northern slope of the mountains of Nfosa at convergence of the beach of the sea, giving it a beautiful location characterized by a slope to the sea, extending from the South to the North and the city rises from the sea by about 50 meters. The city of Al-Khums is now an administrative and service center of the residents of the city. The city is characterized by the presence of the city of Lebda, archaeologically known as "Liptis Magna", which is located in the North-East of the city. In addition to its beautiful location, the presence of sandy beaches and the presence of "Liptis Magna", give the city a great tourist value (Figure 3-2) (Omar Alameen, 2006).



Figure 3-2 Location of Al-Khums City (Url-2)

The border area of the Al-Khums city, consists of four municipalities, Ben Juha, Al-Baladia , Al-Muraqeb and Lebda. This area is about 2000 ha, this area is extending over the Mediterranean coast from Lebda valley East to Al-Tawalib valley in the West by about 6.5 km, from the North Sea coast to the proposed railway route South for about 3 km. It includes the developed urban area of 2005, undeveloped areas, archaeological and private use areas.

3.2. History and Urban Morphology of Al-Khums City

The Great Lebda city (Leptis Magna) was founded in the first century AD on commercial basis as a natural port on the Mediterranean coast. It was reported by means of sailors as well as Phoenicians traders for the duration of their commercial trips. This city soon became a Mediterranean basin and it flourished until the Roman period, which it was named the city of the Great Lebda "Great Liptis". At that period it was the capital of the Roman state, under the reign of Emperor Septimus Severus. Leptis Magna is one of the major historical cities, and the greatness of its monuments and the richness of its history and cultural impact, in addition of being characterized by means of a variety of characteristics, made it unique to other ancient

cities. Leptis Magna is located at the East of the city of Al-Khums at a distance of three km, away from Tripoli, around 123 km in the East direction (Figure 3-3) (Naaddoury, 1996).

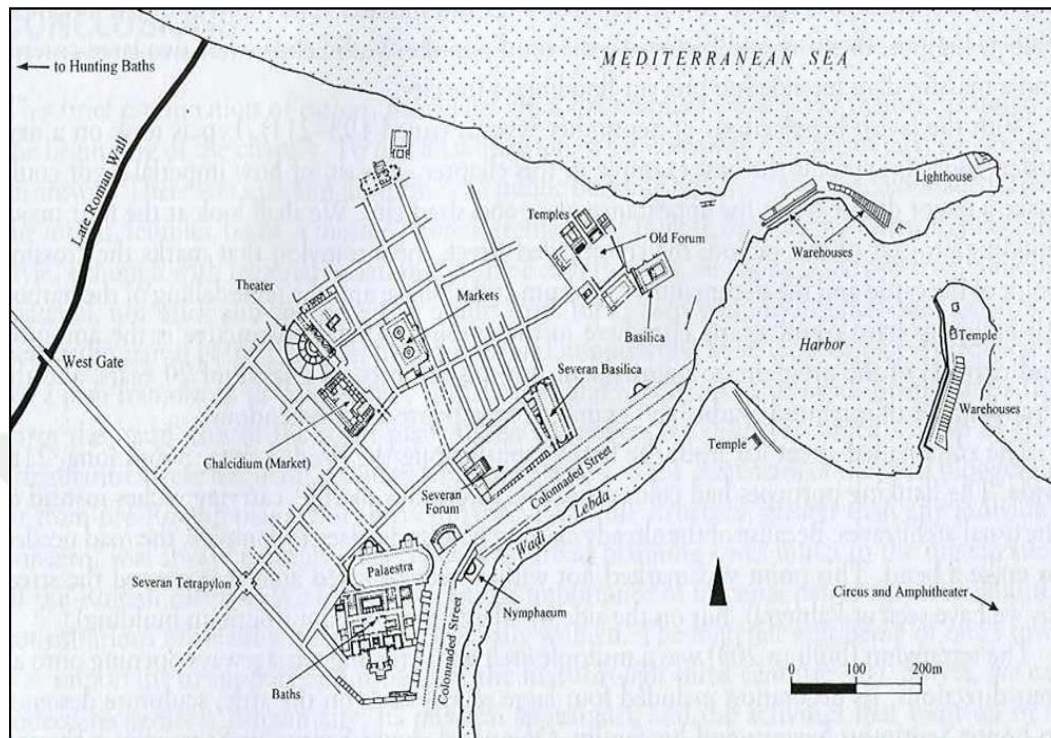


Figure 3-3 Location of Leptis Magna (Url-3)

Leptis Magna was among the biggest cities and an urban expansion, in the era of the Punic, Phoenicians, as well as Romans. Phoenicians started their commercial centers at the North African coast. In another account the period of the founding of the city of Leptis Magna has been registered the sixth century BC. However, in this city, there are no initiated buildings that can be dated back to the Phoenician era, this Phoenician era did not succeed, however, a number of Punic tombs under the platform Roman theatre Leptis Magna (Naaddoury,1996). Since the beginning of the agricultural trade, the city has been renowned for the collection and trade for the well-developed "Allies plant" on the outskirts of this Leptis Magna. According to several historical reports, Al-Khums has been producing large amounts of olive oil trees since ancient times (Al-Ahwal,1990).

Leptis was at the commercial center. It is utilized by the Phoenicians as a trading station or a temporary port for the establishment of the ships and the exchange of

various goods with the locals (Barghouthi, 2004). There are many city landmarks remaining to date. The most prominent of which are Roman theatre, Arc de Triomphe, Arch of Septimus Severus, Amphitheater, Hadrianus baths, and others (Figure 3-4) (Alatherm, 2001). The existing seaport has the great importance of communicating with the other cities of the Mediterranean basin during both the Islamic and the Ottoman eras, through which the products of the city were exported. Historical documents say that this city has been known since the first Islamic era of the existence of residential buildings, antique mosques, shrines, fresh water gardens and various types of trees (Al-Ahwal, 1990).



a.



b.

Figure 3-4 a. Arch of Septimus Severus; b. The Roman Theatre (Url-4; Url-5; Url-6; Url-7)

In the Turkish agreement, the harbour was constructed to serve the commercial movement and several administrative buildings, for instance, the Palace of Government as well as, houses, mosques, schools, and Turkish-style bathrooms (Figure 3-5). The overlap and harmony among the Arab and Turkish architecture of the city were manifested via the coexistence of original inhabitants of the Libyan, Turkish, and external communities. During the Italian period in 1911, Italians governed the Al-Khums city with its markets, trade and water sources, forcing the population to surrender with military orders. The possibilities of the region were harnessed to serve Italian purposes. They made Al-khums a central city with its military garrison and took control of the trade as well as industry, which was famous for the city of Al-Khums during the twenties and thirties of the 20th century (Al-Ahwal, 1990).

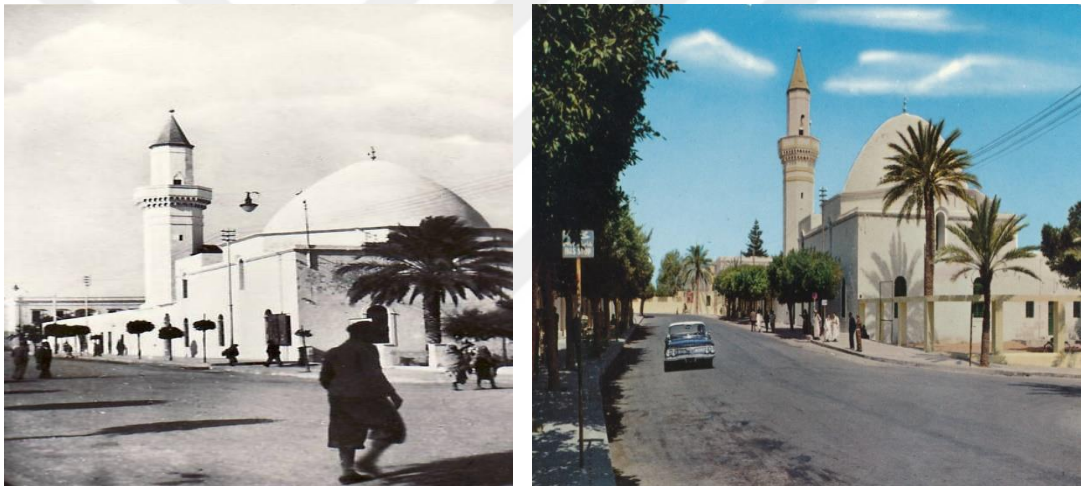


Figure 3-5 Abdul Hamid pasha Mosque (Url-8; Url-9)

The spatial configuration of AL-Khums city is longitudinal with the seashore. Its plan is stripping an (East-West) direction, slopping from the South and West towards the sea. The street pattern consists of longitudinal East-West streets with intersecting streets from the Southwest and West directions. Buildings do not exceed six floors and mostly range between one to three floors. The city is bordered by ALSahil area from the East side, and by the slopes of Nafusa Mountain from the South and West sides. The ALSahil area contains millions of palm trees, and the city consists of Azwaad, Celine and Anakazh areas. Most of the buildings are newly built, except for a few Turkish and Italian buildings that are in the Northeastern part of the city center.

According to studies conducted by population statistics in 2005, Al-Khums has an estimated population of about 42,240 residents, distributing over the four municipalities of the city, namely the municipality "Mahalla Baladia", Mahalla Ben Juha, Mahalla Al-Muraqeb and Mahalla Lebda (Alameen, 2006). The population of the Al-Khums City in 2015, has reached about 52,000 inhabitants; 27,404 of which are males represents 52.7%, and 24,596 are females representing 47.34% (Figure 3-6) (Agael, 2017).

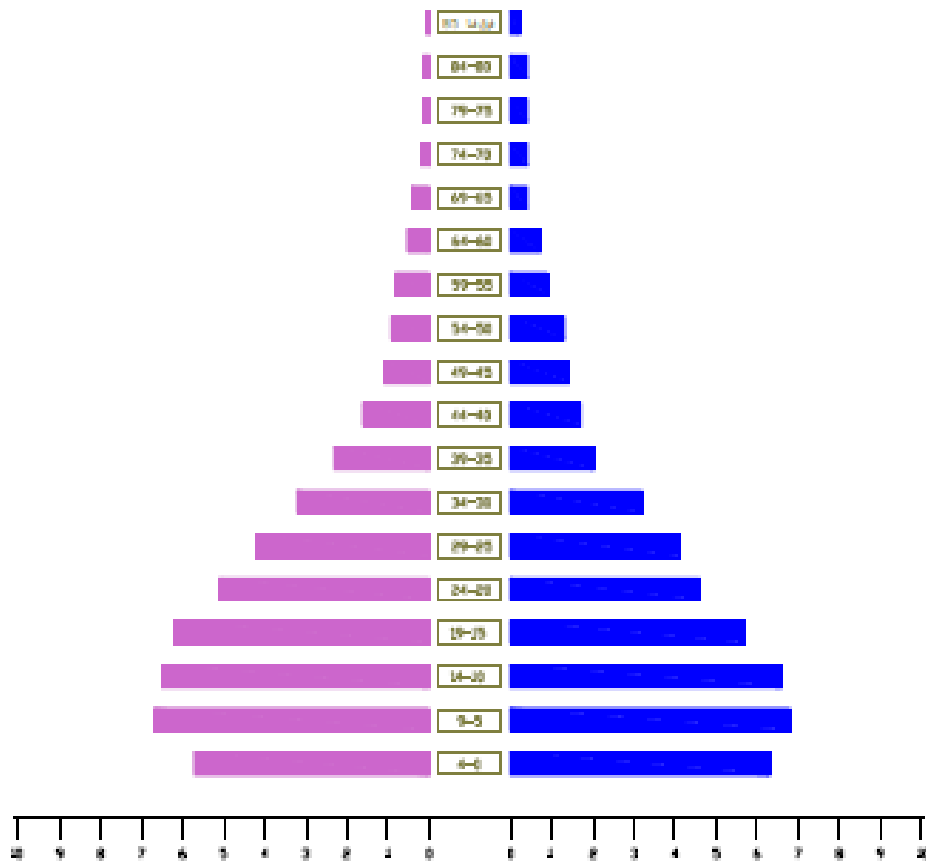


Figure 3-6 Population pyramid of Al-Khums City (Url-10)

3.3. Data Gathering and Analysis

This study depends on descriptive and analytical methods in the process of information gathering and analysis. The study was conducted in July 2017 in the Al-Khums City. In addition, a field survey has been directed conducted with the help of the municipality of the city as well as the police center. The crime rates that took place in the municipality and places where crimes take place are from different time periods for the entire city of Al-Khums (Table 3.1). The study was conducted in city of Al-Khums on the crime rates and distributions for 2016 (Table 3.2). The study focuses to the street network according to space syntax technique, which is mainly concerning the analysis of spatial configuration. Before beginning the analysis, the axial map of the study is established first. The axial map of Al-Khums city was drawn using AutoCAD program and exported as dxf. cad file to UCL DepthmapX software. The processing of axial lines helped on getting integration values and connectivity.

3.3.1. Analysing the data on crime in Al-Khums City

The crime rates and crime types are shown in Table (3.1). According to the penalties prescribed in Libyan law, crime types can be categorized into crimes, misdemeanors and contravention.

1. Crimes are offenses punishable by the following penalties: Execution - Life imprisonment - the prison.
2. Misdemeanors are offenses punishable by the following penalties: imprisonment of more than one month - Financial fine the maximum amount of ten dinars.
3. Violations or Contraventions are offenses punishable by the following penalties: imprisonment with a maximum duration of one month - The fine that exceeds the maximum amount of ten dinars (Libyan Penal Code).



Figure 3-7 Street names of Al-Khums City

Table 3.1. Crime Rates in the Al-Khums City-Libya

| Year | Crimes | Misdemeanor | Contravention | Total | Criminals | | | | | Total |
|-------|--------|-------------|---------------|-------|-------------|----------------|---------------|------------------|-------------|-------|
| | | | | | Adult males | Teenager males | Adult females | Teenager females | | |
| 2012 | 97 | 300 | 20 | 417 | 546 | 2 | 17 | - | 565 | |
| 2013 | 104 | 399 | 37 | 540 | 845 | - | 8 | - | 853 | |
| 2014 | 50 | 215 | 23 | 288 | 387 | 1 | 5 | - | 393 | |
| 2015 | 33 | 130 | 19 | 182 | 227 | 2 | - | - | 229 | |
| 2016 | 63 | 275 | 10 | 348 | 421 | - | 10 | - | 431 | |
| Total | 347 | 1319 | 109 | 1775 | 2426 | 5 | 40 | - | 2471 | |

The classification of crime types in this study is based on the places of occurrence according to the information obtained from the city municipality (Tables 3.2).

Table 3.2. Types of crimes in 2016

| Types of crimes in 20116 | Count |
|------------------------------|-------|
| Theft | 144 |
| Crime of quarrels | 130 |
| Drugs | 42 |
| Kidnaps | 19 |
| Big Crimes (Murder, killing) | 13 |
| Total | 19 |

The places of crime were obtained from the municipality of the Al-Khums City, where they were informed about most of the places where the crimes occurred, are the busiest places, in terms of people movement or neighbourhoods crowdedness. In other words, crimes are located on the main streets of the city. The streets with most crime scene are 17th February street and Ben Juha Street. The next places, are Tripoli street, Twenty street and Labda Street. Some of the crimes also spread to other streets in Al-khums city (Table 3.3, 3.4, 3.5, 3.6 and 3.7) (Figures 3-7, 3-8, 3-9, 3-10 and 3-11).

Table 3.3. Theft in Al-Khums City in 2016

| Places | Theft Count |
|----------------------|-------------|
| 17th February Street | 32 |
| Coastal road | 27 |
| Lebda Street | 24 |
| Ben Juha Street | 22 |
| Tripoli Street | 8 |
| Al-Harati Street | 7 |
| Al-Baladia Street | 6 |
| Ashim Street | 4 |
| Al-Medina Street | 4 |
| Twenty Street | 3 |
| Al-Nawaar Street | 3 |
| Port road | 2 |
| Kuliya Street | 1 |
| Al-Shat Street | 1 |
| Total | 144 |

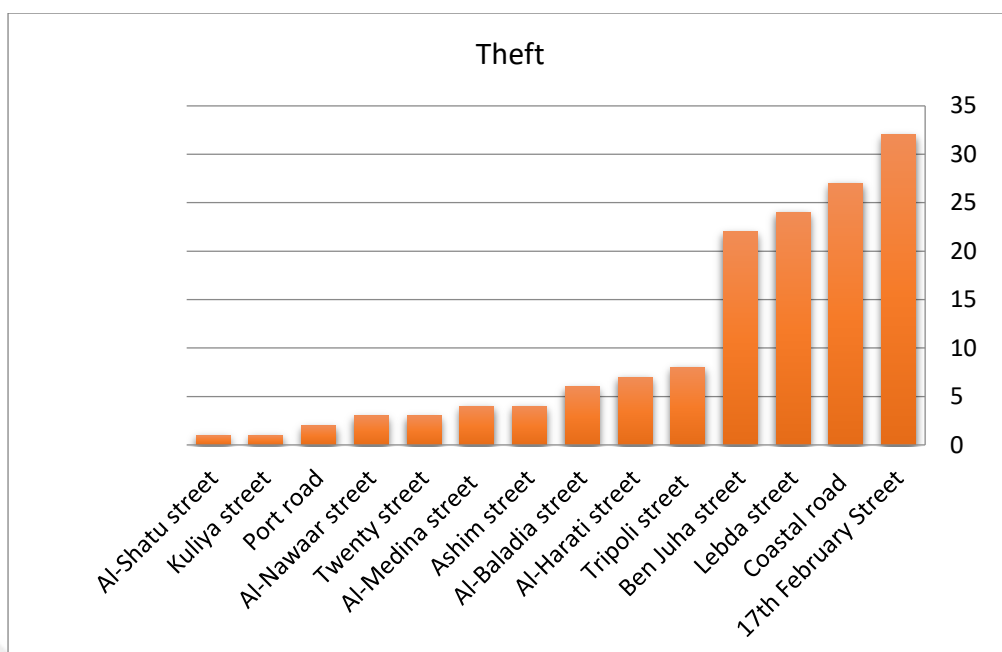


Figure 3-8 Theft in Al-Khums City in 2016

Table 3.4. Crime of quarrels in Al-Khums City in 2016

| Places | Quarrels Count |
|----------------------|----------------|
| 17th February Street | 36 |
| Lebda Street | 28 |
| Tripoli Street | 16 |
| Ben Juha Street | 15 |
| Al-Riyadia Street | 13 |
| Twenty Street | 11 |
| Al-Baladia Street | 6 |
| Al-Harati Street | 2 |
| Al-Shat Street | 1 |
| Al-Nawaar Street | 1 |
| Coastal road | 1 |
| Total | 130 |

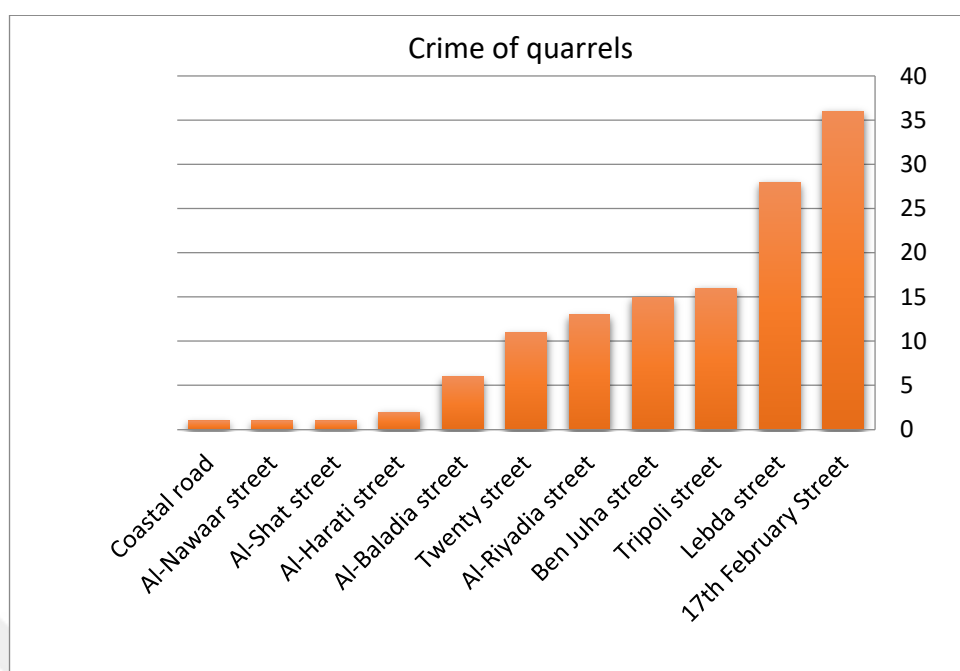


Figure 3-9 Crime of quarrels in Al-Khums City in 2016

Table 3.5. Drug Crimes in Al-Khums City in 2016

| Places | Drug Crimes Count |
|--------------------|-------------------|
| Lebda District | 17 |
| Al-Squtra District | 13 |
| Al-Shat Street | 8 |
| Ben Juha Street | 5 |
| Total | 42 |

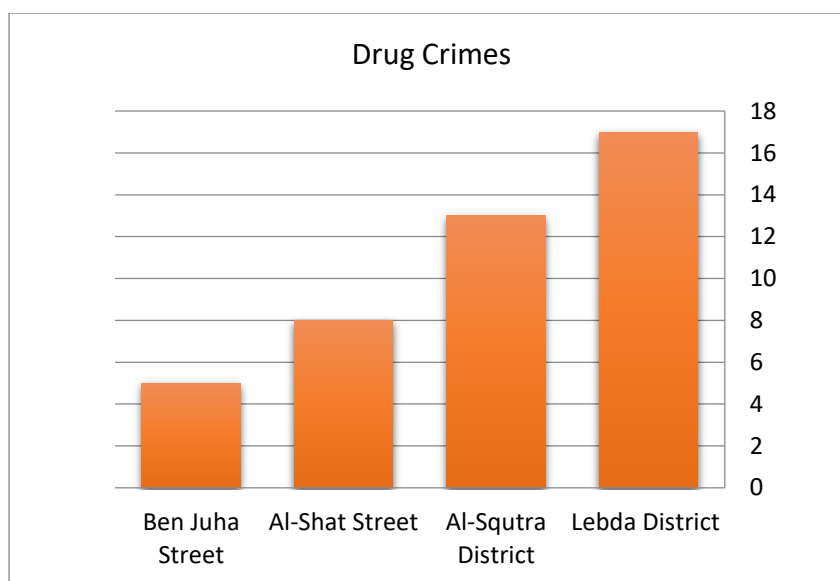


Figure 3-10 Drug Crimes in Al-Khums City in 2016

Table 3.6. Kidnaps in Al-Khums City in 2016

| Places | Kidnaps Count |
|----------------------|---------------|
| Ben Juha Street | 5 |
| Twenty Street | 4 |
| Coastal road | 4 |
| 17th February Street | 4 |
| Al-Riyadia Street | 1 |
| Al-Harati Street | 1 |
| Total | 19 |

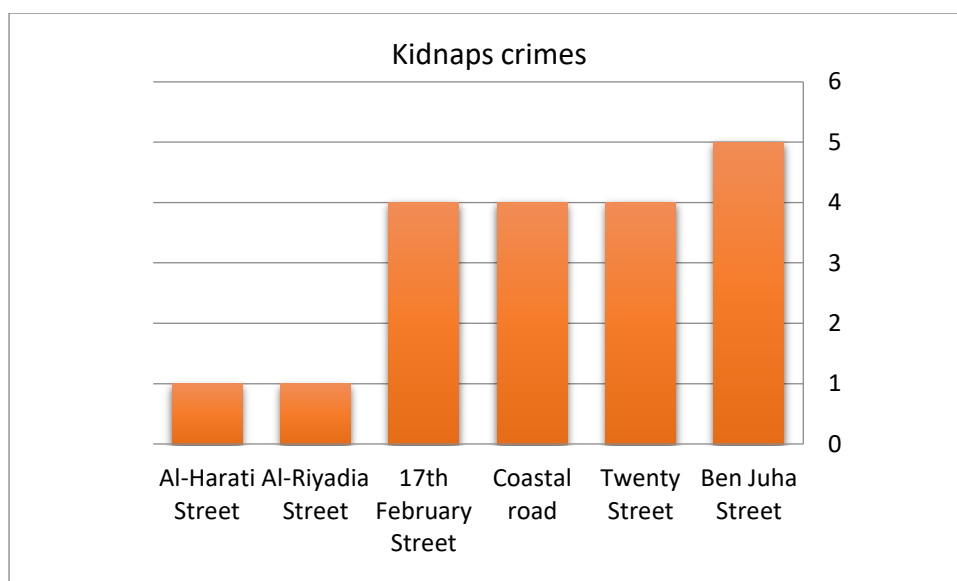


Figure 3-11 Kidnaps in Al-Khums in City 2016

Table 3.7. Big Crimes "Murder" in Al-Khums City in 2016

| Places | Big Crimes Count |
|----------------------|------------------|
| Al-Shat Street | 2 |
| Lebda District | 2 |
| Twenty Street | 2 |
| Coastal road | 2 |
| 17th February Street | 1 |
| Ben Juha Street | 1 |
| Port road | 1 |
| Al-Nawaar Street | 1 |
| Kuliya Street | 1 |
| Total | 13 |

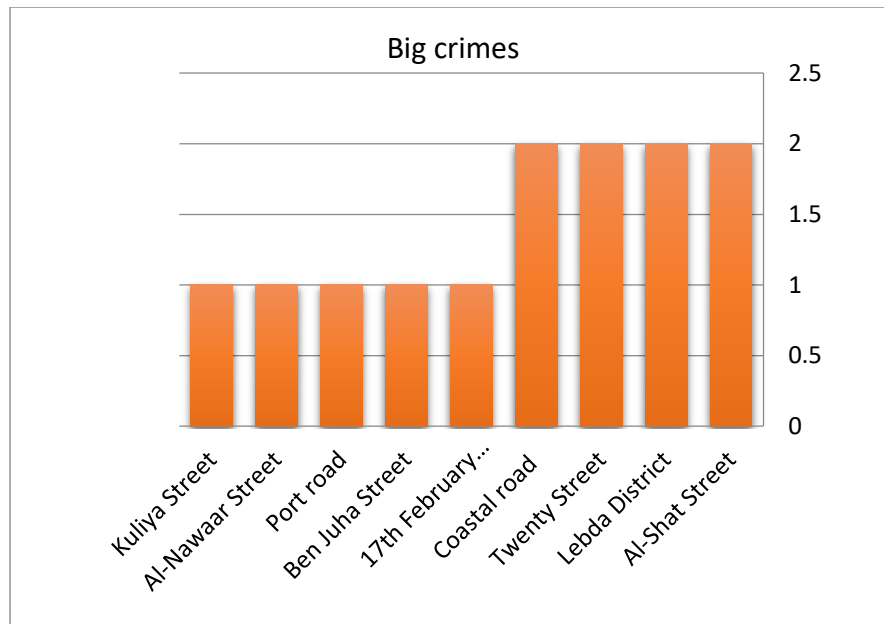


Figure 3-12 Big Crimes (Murder, killing) in Al-Khums City in 2016

17th February Street is the main street in Al-khums; it consists of various activities, for instance, commercial activities (with shops, restaurants and cafes) and administrative, governmental and residential areas (Figure 3- 13). The heights of the buildings ranges between 3 to 6 floors in this street, but some buildings are up to 8 floors. The first and second floors are usually for commercial and administrative activities, as well as the third floor in a few buildings. The rest of the floors are residential. Also, there is an obvious increase in the publics' movement either for vehicles or pedestrians in this area, depending on the close location of main terminals and "Hara Al-Gdima", which contains a collection of shops. Furthermore, there is a closed market called "Aqwas" for meat and for a variety of shops, this area is utilized as a daily market. It can be noticed as a gathering place of several individuals, with people coming from neighbouring cities, as well as people of diverse nationalities, and that leads to the prevalence of crimes.

The marble square is located in the middle of the 17th February Street, where the directorial and governmental buildings are located. It can be noticed that areas with increased people's movement, whether as pedestrians or by vehicles, are extremely crowded, consequently they come to this area from the suburbs and from neighbouring cities, and this area is considered as the place having the major importance in the city. This area witnessed for several demonstrations, celebrations, and religious events, which often lead to quarrels in recent periods. Moreover, at are

of the areas where crimes occur in the 17th February Street in the vicinity of "all Arabs" cafe, the traffic is crowded at peak hours and in the evening, however, it becomes low, especially at night.



Figure 3- 13 17th February street

Ben Juha Street is one of the branches of 17th February Street, which has great importance of the city in terms of commercial practices, and accordingly a lot of crimes occur in this street. "Ben Juha" represents residential, commercial and administrative areas, with pedestrians' movement as well as vehicles. This region is fully crowded at peak hours, and according to statistics and data gathering, there is more than one type of crime in this region, such as theft and quarrels (Figure 3-14).



Figure 3-14 Ben Juha Street

Tripoli Street is a main and a vital Street in the city, linking the city to the Coastal road; it is the road that leads to the city of Tripoli in the West and to the neighbouring cities to the East. This area consists of governmental, administrative, commercial, educational and residential buildings. The end of this street leads to the roundabout as well as Al-Shat Street. This Street has an increased number of vehicle and pedestrian movement with the rise in crimes of theft and quarrels (Figure 3-15).



Figure 3-15 Tripoli Street

Twenty Street and Al-Harati District region are districts with a high population, which are residential and a commercial. The crimes usually occur in the commercial area, and not within the residential area, because of the presence of shops on that streets. Twenty Street and Al-Harati street are representing shops and healthcare centres. These streets are located in an important residential area of the city, it is noticeable that traffic are crowded in these streets, with increased rates of crimes such as: theft and quarrels (Figure 3-16).



Figure 3-16 Twenty Street

Neighbourhoods with low economic and low social status and high population have high crime rates. For instance, the district of Lebda, where high housing density is observed, consists of residents from diverse cities of Libya. The district is considered as a large residential area, and has been named after the archaeological city "Leptis Magna" (Figure 3-17). According to the data gathering about the crime sites, this study has found that Lebda Street abounds theft and quarrels. This street is one of the central streets in the city, the residential neighbourhoods in the East have utilized this street to access the city center.

This neighbourhood is classified into a collection of multi-story buildings up to four floors, and there is a number of entrances and no security in this part of the neighbourhood. It was observed that some of the apartments are small in size and are inhabited by large families. As a consequence it can be seen that young adults go out to the streets and squares, to flee from their homes as an outcome of the small places, and that leads them to commit crimes. For that reason that there is no family attention, and the education level is low. The other part of the Lebda neighbourhood so called "Shaebia" is considered as one of the old neighbourhoods and the buildings consist of one or two floors, and some of the streets are with closed ends. These streets create an active environment, that encourage criminal opportunities and the committing of crime.



Figure 3-17 Lebda District

On other hand, neighbourhoods with high economic and high social status, and low population have low crime rates, as in the "Dollar neighbourhood", which consists of modern designed residential buildings. Local residents of this area are considered to have high level of monthly pension, and according to the information, none of the crime types mentioned earlier has been detected in this region.

If we look to the land use in Al-Khums city, urban planners have been utilizing models of different structures to help in the plan and redevelopment of urban communities and surrounding regions. Many arranging models take the state of physical plans and formats for urban structures, coordinating subjects and ideas distinguished by planners that are most appropriate or desirable for urban living (Figure 3-18). The structure standards center around walk-ability and simple access to work, shopping, school and garden areas for all urban occupants, long side with markets where the surrounding farmers can offer their produce. In this area, the crimes were correlated with different land uses that can be classified in the use of the activity represented by commercial areas, unused uses taken from cemeteries, valleys and old buildings or, on the other hand, a blend of them represented by industrial zones, and also the study of local locations, including the old residential areas. Land uses can offer offenders the opportunity to carry out their crimes by reproducing activities and movements.

The information and data relating to the existing land use of the city, are obtained from the field survey and Urban Planning Department in the city. The city provides services to the neighbouring areas as an administrative center of the Al-Khums city, although the planning period for the second generation plans ended in the year 2000. It was observed that there were spaces neglected and untapped, and the overlap of land use are especially next to the coast road, which links to the rest of the Al-Khums' provinces. The growth of the city is restricted by the sea and the coastal road, and also it was observed that the growth of the city on the West and South sides is limited until now.

Through the field study of the existing situation in the city of Al-Khums, it was noticed that the urban area was implemented as part of the comprehensive plan designed for the city in 2000, (including residential areas, public services and the city center). It was observed that the comprehensive part of the urban area have some urban deficiencies, due to defects and irregularities in the implementation of the approved scheme, the deficiency in the areas of service, like conflicts of use and deficiency of some public services.

The spatial distribution of crime is linked to the use of commercial, administrative and governmental lands. These facilities can generate or cause crime. Land uses are connected to the street network, as the street network operates on pedestrian and vehicle traffic that form the distribution of land uses. The locations of the crimes in the city of Al-Khums are concentrated on the use of government, administrative and commercial lands, represented in the streets of 17th February, Ben Juha and Tripoli. And except for the drug crime, crimes are concentrated on residential areas in the neighbourhoods of Lebda and Al-Squtra district .

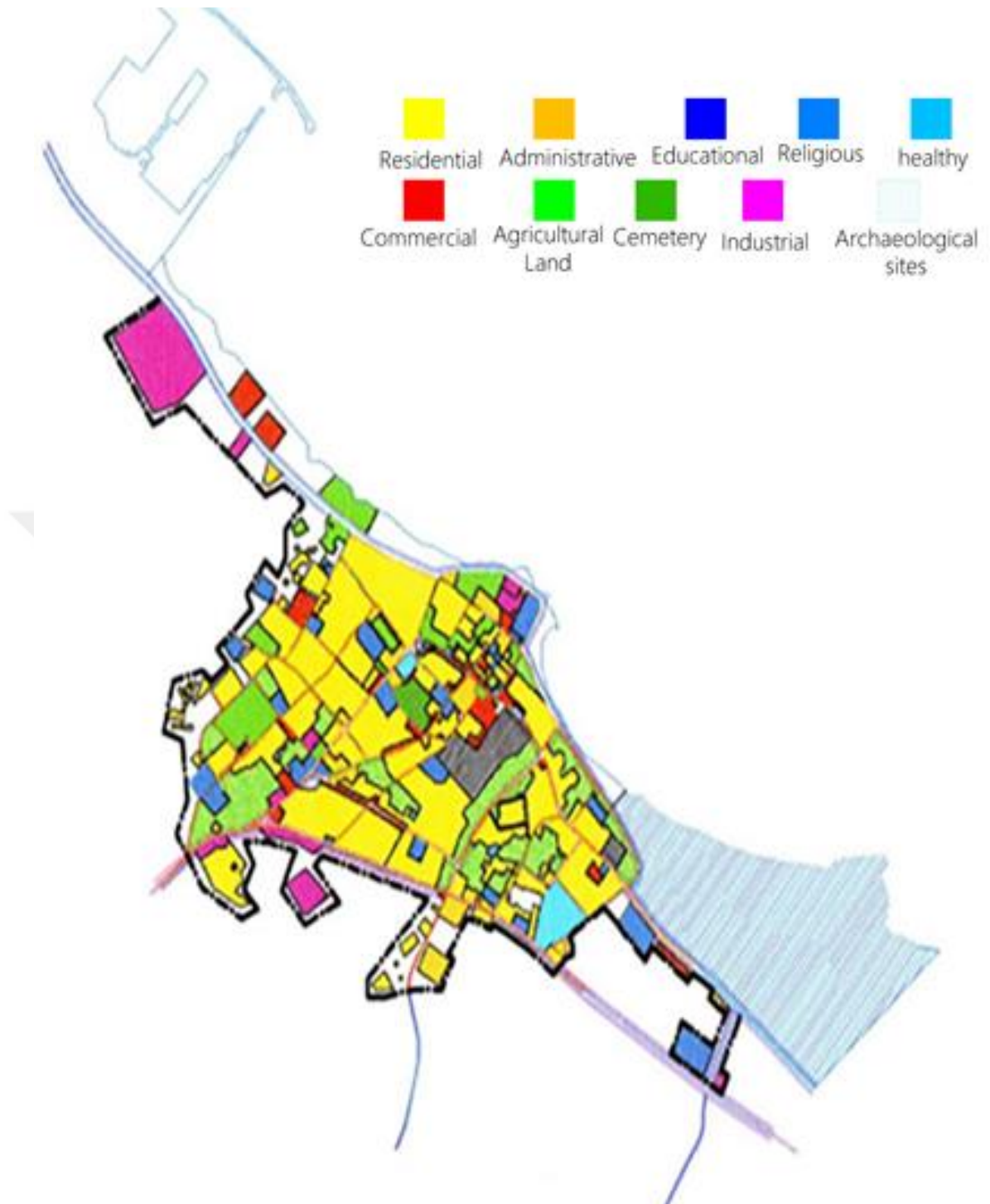


Figure 3-18 Land Use of Al-Khums City (Url-11)

3.3.2. Street Networks Analysis in Al-Khums City

This study depends on the analysis of the street network according to the technique of space syntax; the data is generated by the mapping of the case study area by drawing the longest and lowest axial lines to get the axial map. The maps are analysed using UCL DepthmapX software, which includes: analysis of the values of the global integration, local integration R3, and connectivity.

Based on the assumption that criminals always choose places that require the least amount of time and energy to commit their crimes, The city of Al-Khums was chosen as a case study, since it includes districts that transport and generate offenders at the same time. It was difficult to distinguish whether the offenders were internal or external, in particular because most of these neighbourhoods that the city of Al-Khums incorporates, such as governmental, commercial and residential areas, are situated within downtown, which attracts individuals, visitors from various areas, regardless of whether criminals or not.

3.3.2.1. Processing The Axial Maps

Processing axial maps means subjecting them UCL DepthmapX, in order to get numerical values from street network analysis in terms of: global integration, local integration (R3) and connectivity values (Figure 3-18).

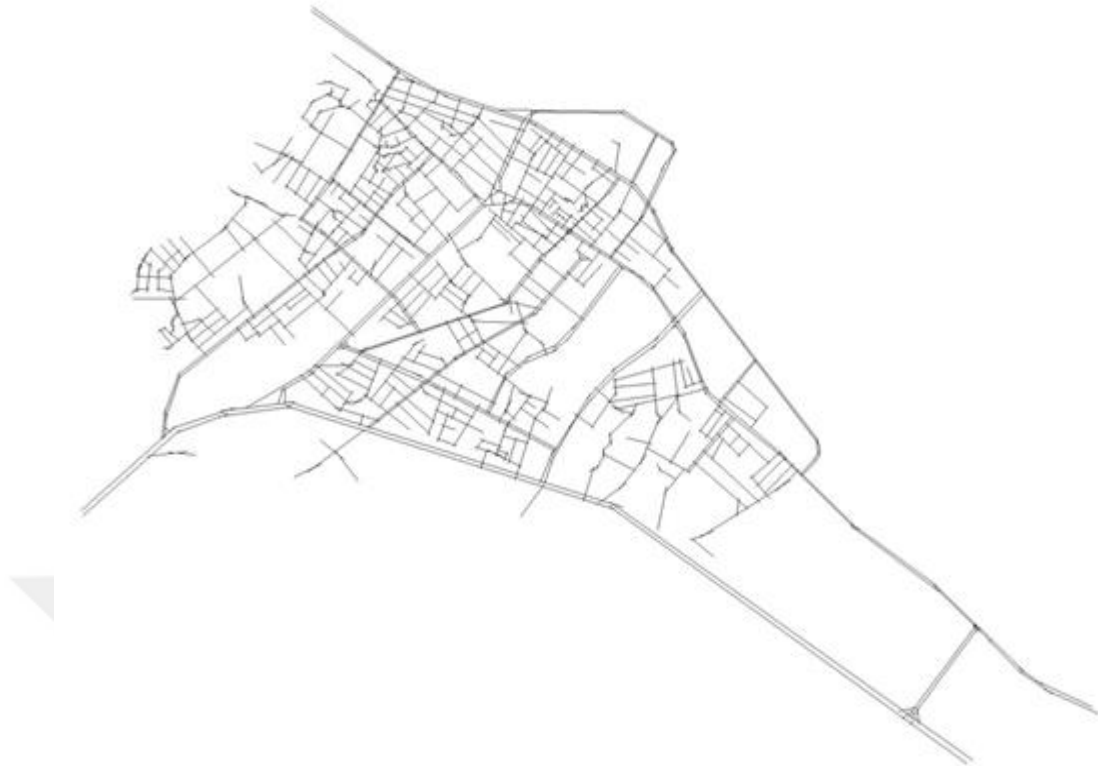


Figure 3-19 Axial Maps of Al-Khums City

- Global integration and local integration values in Al-Khums City:

The presence of a greater number of individuals seems to offer high detection and arrests criminals as well as potential hazards. Frequently, higher integration is associated with higher traffic levels at diverse levels of pedestrian and vehicle values. As an outcome, the more the human are present in an area, the more difficult the potential will be for those trying to commit criminal act. The red colours represent the highest values and then the orange, yellow, green as well as blue colour represent the lowest values (Figure 3-20).



Figure 3-20 Global Integration of Al-Khums City

The space syntax is able to identify these routes and characterize their basic spatial conditions. In this way, the space syntax is able, for instance, show how the segregated streets have more complex roads for all the other streets of a city compared to the integrated ones. For example Lebda neighbourhood, according to global and local integration, represent green and blue colours, indicating the least integrated and the most segregated lines.

The space syntax has shown that areas with segregated spaces, where urban networks are visually fragmented, and where few dwelling entrances constitute the roads, are often influenced by crime and social instability (Hillier and Shu, 2000), concluding the fact that the neighbourhood has many different crimes.

The streets which are red coloured indicate highest integration and less separation. During the observation process it is noticeable that the movement of vehicles as well as pedestrians, is heavy at peak hours. The global and local integration maps of Al-Khums city represent that Tripoli street has the highest integration in this city with by including longest segments. This street contains many different shops,

governmental offices, security services, travel and tourism offices and other activities. This street is one of the most important streets in the city (Figure 3-19 and 3-20). Madina Street and 17th February Street also represent red colour in the local integration maps. Madina Street branches out from Tripoli street, and it contains shops (for carpets and furniture) and governmental offices. The 17th February Street is also one of the most important streets in the city, which is a lively street and contains diverse shops, administrative centers, governmental offices, engineering companies, and banks. These streets are located in most integrated and less separated areas, and they streets encourage criminals to commit robberies, crimes of quarrels as well as skirmishes (Figure 3-21).



Figure 3-21 Local Integration of Al-Khums City

- Connectivity values in Al-Khums City:

The connectivity map of the Al-khums city showed that Tripoli Street, 17th February Street and Gamie Aljadid Street are in red colour, which indicates that they have highest connectivity values in the city. These streets are crowded into pedestrians and vehicles. As mentioned previously, Tripoli Street and 17th February Street are one of the streets where several crimes have been committed, making it easy for criminals to escape from other streets. The streets that represent the green and the blue colours are the streets having lowest connectivity values and these streets represent the residential areas as in the case of Islamic cities that have more privacy (Figure 3-22).



Figure 3-22 Connectivity of Al-Khums City

In the Frome of social aspects and effects of crime the role played by social and economic factors as one of the main reasons for increased crimes are strongly highlighted. The higher the economic and social level in the province, the lower the crime rate and vice versa. Based on the information obtained from the city municipality and the places of the crimes, the subsequent points can be noticed:

- The majority of perpetrators of crimes were single youths.
- The prevalence of crime was noticeable among youths with the low education, that did not exceed the intermediate stage.
- The perpetrators of crimes were of the unemployed individuals.
- Low monthly income in the families of perpetrators of the crimes.
- The youth perpetrators do not have any monthly income.
- The weakness for parental authority is one of the factors leading to the commission of a crime.
- Family instability for youth as an outcome of polygamy leads to the commission of a crime.

3.4. Comparison between crime rates and space syntax

This study discusses the relation between the crime rates and spatial configurations "global integration, local integration and connectivity", according to the space syntax, through the analysis values.

The main streets in the Al-Khums city are the places where more crimes occur (Figure 3-23,3-24 and 3-25), 17th February and Ben Juha Streets are the streets where most of the crime occurred, such as theft and quarrels. On the second place, Tripoli Street and Twenty Street are the streets where crimes occur, such as theft and quarrels. On the third place, Lebda Street, where crimes occur such as theft and quarrels in addition drug crimes.

The global integration maps of the Al-Khums city for the 17th February Street and Ben Juha Street represented by the yellow colour, indicating medium integration. The global integration maps indicate that Tripoli Street has the highest integration values, represented by the red colour. The global integration maps for Twenty Street is represented by red and orange colours, indicating high integration values. Also, the global integration maps Lebda Street is represented by the colours between yellow and blue, indicating medium to low integration values.

In the local integration maps of the Al-Khums city for the 17th February Street and Ben Juha Street represented by the red colour, indicating both the most highest integration. They are the main streets in the city. This area of the city includes commercial, governmental and administrative areas, indicating that the movement of people is heavy both for pedestrians and vehicles. They are active environments for such crimes; 4 kidnapping and one big crime (murder) is occurred in 17th February Street in 2016. The local integration maps indicate that Tripoli Street has the highest integration values, represented by the red colour. This street is one of the main streets in the city, which includes commercial and governmental areas, and shows the movement of people and vehicles greatly. Whereas the local integration maps for Twenty Street is represented by red and orange colours, indicating high integration values. This area includes dedicated commercial districts, such as women's and children's shops, and a residential area. In addition to theft and skirmishes crimes, two big crimes "murder" and four kidnapping crimes have been reported in this area in 2016. The local integration maps Lebda Street is represented by the colours between yellow and blue, indicating medium to low integration values.

Also, according to the connectivity maps of the Al-Khums city, for the 17th February Street and Ben Juha Street have the highest connectivity values of this area, represented by the red colour. In addition Tripoli street in the connectivity maps is also represented by the red colour, indicating the highest connectivity values in the city. The connectivity maps for Twenty street represents the colours between orange and green, indicating medium connectivity in the city. The Lebda street has low connectivity values. Crimes such as thefts and quarrels occurred in this street (Figure 3-20, 3-21 and 3-22). This street is located in a residential neighbourhood, which connects the city's suburbs to the center of the city.

It is noticed that other types of crimes, such as drug crimes were deployed inside the Lebda neighbourhood, as well as two big crimes as "murders". Needless to say that such crimes require separated areas, where the movement of vehicles and pedestrians is reduced. The streets in this neighbourhood are represented in the blue colour, indicating that they are less integrated, most segregated and less connected.

Furthermore, drug crimes have been also detected in the Al-Squtra neighbourhood, which is located next to the Harati neighbourhood. The streets in this district, are less integrated, most separated, and less connected, and they are represented by blue colour. With the exception of the crimes that occurred in the city, it was recently, observed that the coastal road is one of the roads in which cars theft, 4 kidnappings and big crimes "murders" occurred. However, such crimes did not occur in the past. The integration maps for this road represent the colours between orange and green, indicating medium to low integration, with low connectivity values. This road connects the city to neighbouring cities.

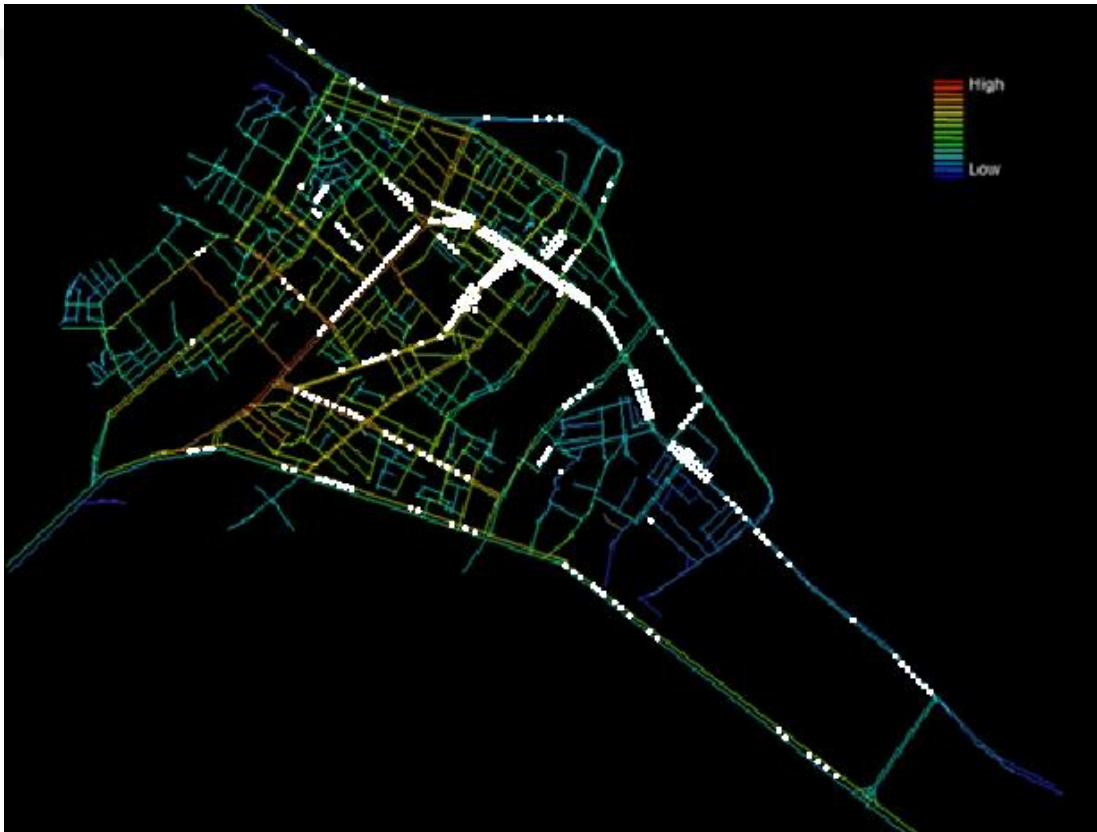


Figure 3-23 Total Crimes and Global Integration

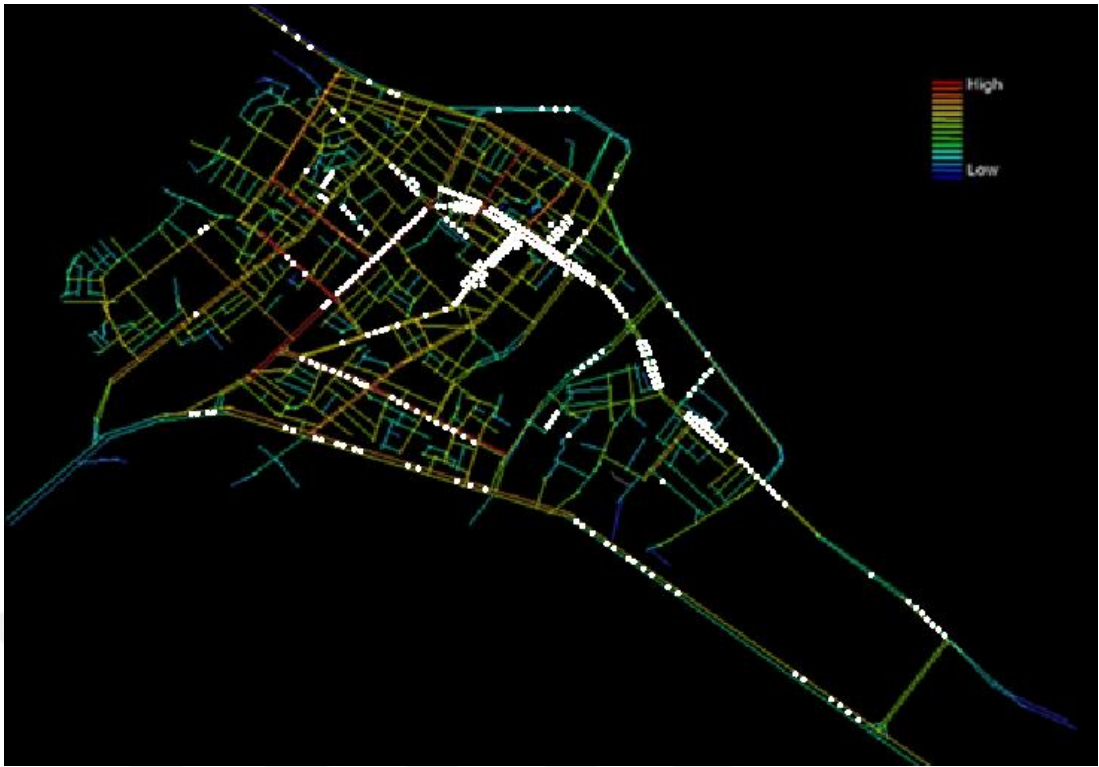


Figure 3-24 Total Crimes and Local Integration

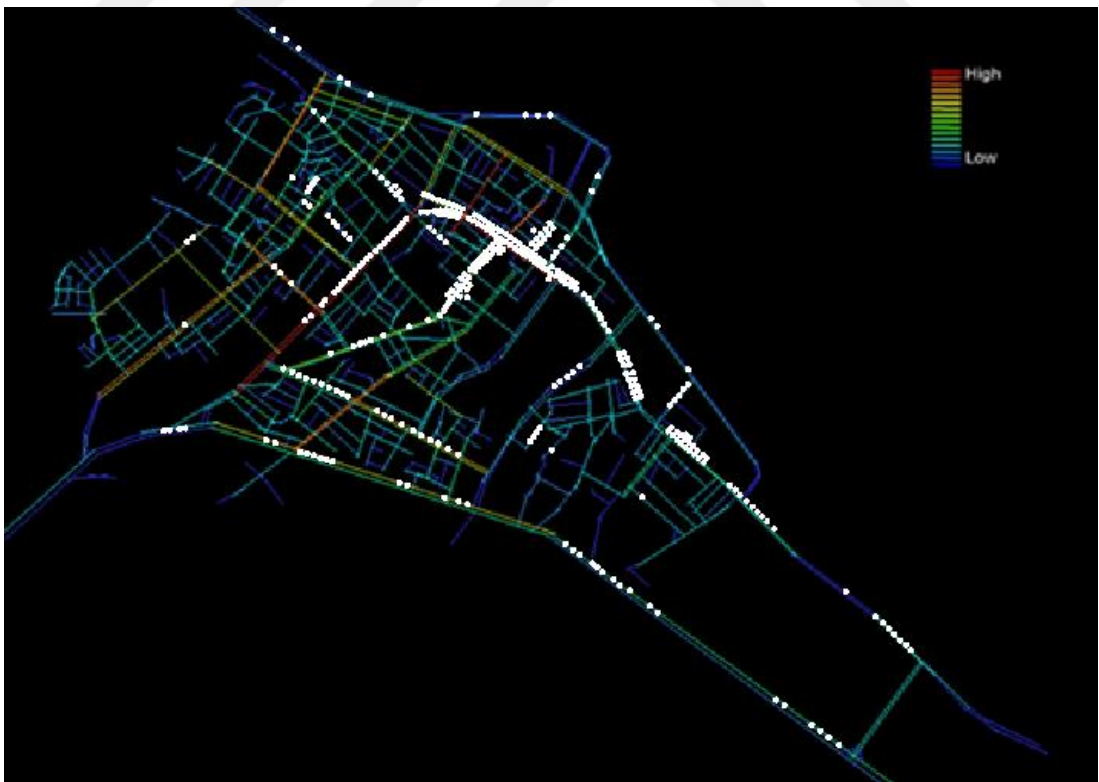


Figure 3-25 Total Crimes and Connectivity

According to the above mentioned methodology the axial map was created for the city of Al-Khums city. It was layered by the map with exact locations of analysed types of crime, then certain crimes were assigned to street networks, after that the correlation analysis identifying the relations between total crimes and spatial configuration of street networks was performed. Results show that main streets are more vulnerable to some crimes. The types of crimes and spatial configuration in Al-Khums City are shown in the Table 3.8.

Table 3.8.1. The types of crimes and spatial configuration in Al-Khums City

| Line ID | Theft | Quarrels | Drugs | Kidnaps | Big Crimes | Total | Global Integration | Local Integration | Connectivity |
|---------|-------|----------|-------|---------|------------|-------|--------------------|-------------------|--------------|
| 1 | 2 | 5 | - | - | - | 7 | 0.9534 | 2.2275 | 8 |
| 2 | 1 | - | - | - | - | 1 | 0.8826 | 1.70019 | 2 |
| 3 | 2 | 7 | - | - | - | 9 | 0.8472 | 2.2499 | 8 |
| 4 | 9 | 9 | - | - | - | 18 | 0.9076 | 2.2967 | 7 |
| 5 | 6 | 7 | - | - | 1 | 14 | 1.0593 | 2.0322 | 4 |
| 6 | - | - | - | - | 1 | 1 | 0.76098 | 1.7873 | 4 |
| 7 | - | - | 2 | - | - | 2 | 0.85301 | 1.0952 | 2 |
| 8 | - | - | 5 | - | - | 5 | 0.9764 | 1.8421 | 4 |
| 9 | - | - | 3 | - | - | 3 | 1.09789 | 2.2168 | 6 |
| 10 | - | - | 5 | - | - | 5 | 1.1221 | 1.5763 | 2 |
| 11 | - | - | 4 | - | - | 4 | 0.9999 | 1.7822 | 4 |
| 12 | - | - | 1 | - | - | 1 | 0.8063 | 1.2241 | 3 |
| 13 | 4 | - | - | - | - | 4 | 1.1985 | 2.2132 | 7 |
| 14 | - | 3 | - | 3 | - | 6 | 1.3047 | 2.3373 | 3 |
| 15 | - | 2 | - | - | - | 2 | 1.2125 | 2.2118 | 3 |
| 16 | 24 | 16 | - | 1 | 1 | 42 | 1.4962 | 3.2046 | 15 |
| 17 | 5 | 6 | - | - | - | 11 | 1.2083 | 2.2296 | 4 |
| 18 | 2 | - | - | - | - | 2 | 1.5158 | 2.3253 | 1 |
| 19 | 3 | 1 | - | - | - | 4 | 1.2713 | 2.5214 | 8 |
| 20 | 6 | 6 | - | - | 1 | 13 | 1.2499 | 2.4877 | 8 |
| 21 | - | - | 2 | - | - | 2 | 1.1291 | 2.1185 | 5 |
| 22 | - | - | 3 | - | 1 | 4 | 0.8924 | 1.3988 | 3 |
| 23 | 9 | 10 | - | 2 | - | 21 | 1.3946 | 3.1943 | 16 |
| 24 | 10 | 5 | 1 | 3 | - | 19 | 1.4494 | 2.7316 | 9 |

Table 3.8.2. The types of crimes and spatial configuration in Al-Khums City

| Line ID | Theft | Quarrels | Drugs | Kidnaps | Big Crimes | Total | Global Integration | Local Integration | Connectivity |
|---------|-------|----------|-------|---------|------------|-------|--------------------|-------------------|--------------|
| 25 | 4 | - | - | - | - | 4 | 1.3055 | 2.6122 | 8 |
| 26 | 3 | - | 4 | - | - | 7 | 1.4962 | 2.7511 | 9 |
| 27 | - | - | - | - | 1 | 1 | 1.3301 | 2.3628 | 6 |
| 28 | 8 | 16 | - | - | - | 24 | 1.8172 | 3.3646 | 15 |
| 29 | 4 | - | - | - | - | 4 | 1.6264 | 3.1803 | 13 |
| 30 | - | - | 1 | - | - | 1 | 1.2803 | 2.5353 | 8 |
| 31 | - | - | 2 | - | - | 2 | 1.1176 | 1.7797 | 3 |
| 32 | - | - | 3 | - | - | 3 | 1.0710 | 1.0445 | 2 |
| 33 | - | - | 5 | - | - | 5 | 0.9806 | 1.5153 | 2 |
| 34 | - | - | 2 | - | - | 2 | 1.1206 | 1.4831 | 2 |
| 35 | 1 | - | - | - | 1 | 2 | 1.3464 | 2.6523 | 11 |
| 36 | - | 13 | - | 1 | - | 14 | 1.3881 | 2.9666 | 14 |
| 37 | 5 | 2 | - | 1 | - | 8 | 1.4751 | 2.6077 | 15 |
| 38 | 2 | - | - | - | - | 2 | 1.1281 | 2.5426 | 7 |
| 39 | 1 | 1 | - | - | 1 | 3 | 1.4678 | 2.5959 | 6 |
| 40 | 2 | - | - | - | 1 | 3 | 1.2086 | 2.1902 | 3 |
| 41 | 1 | 7 | - | 1 | 1 | 10 | 1.6027 | 2.9355 | 8 |
| 42 | 2 | 4 | - | 3 | 1 | 10 | 1.4835 | 3.0713 | 13 |
| 43 | 4 | - | - | - | - | 4 | 1.4904 | 2.2343 | 2 |
| 44 | 12 | - | - | - | 1 | 13 | 1.4369 | 2.8855 | 11 |
| 45 | 11 | 1 | - | 4 | 1 | 17 | 1.2139 | 2.3036 | 7 |

Analysing the correlations between each of the previous values and crime rates by SPSS (Statistical Package for Social Sciences). Descriptive statistics of total crime and spatial configuration, correlations (N = 45) and Total crimes and spatial configuration- syntactic analysis SPSS correlations are shown in the Tables (3.9 and 3.10).

Table 3.9. Descriptive statistics of total crime and spatial configuration, correlations (N = 45)

| Descriptive Statistics | | | |
|------------------------|----------|----------------|----|
| | Mean | Std. Deviation | N |
| Total crime | 7.53 | 7.965 | 45 |
| Global Integration | 1.221697 | .2480034 | 45 |
| Local Integration | 2.280422 | .5765218 | 45 |
| Connectivity | 6.69 | 4.252 | 45 |

Table 3.10. Total crimes and spatial configuration- syntactic analysis SPSS correlations

| | | Correlations | | | |
|-------------|---------------------|--------------|--------------------|-------------------|--------------|
| | | Total crime | Global Integration | Local Integration | Connectivity |
| Total crime | Pearson Correlation | 1 | .378* | .548** | .616** |
| | Sig. (2-tailed) | | .011 | .000 | .000 |
| | N | 45 | 45 | 45 | 45 |

*. Correlation is significant at the 0.05 level (2-tailed).

** . Correlation is significant at the 0.01 level (2-tailed).

The correlation between total crime and spatial configuration indicate that there is a strong relationship between total crimes with connectivity values of streets (0.616**) which is significant in 0.01 level (Table 3.10). Whereas the total crime counts' correlation with local integration is also strong (0.548**) and is significant in 0.01 level. A little differently, the total crime count has a low correlation with global integration values of the streets, but still it is statistically significant in 0.05 level. After analyzing and observing the correlations, it has found that the strongest relationship was between connectivity values and total crime counts. But it is also notable that local integration values have strong correlation with total crime counts. The relationship between variables drupe between medium to high values (0.378 to 0.616). The most at the crimes occurred in the main streets of the city, which include variety of activities, have highest pedestrian traffic and vehicle traffic. They are located in an area that has high local/ global integration values medium to high connectivity values. There are crimes that occurred on the streets have low integration and connectivity values; but they did not affect the results overall.

- Correlations between thefts and other variables (N = 45)

The table shows the correlation between thefts and "global integration, local integration and connectivity values" through SPSS.

Table 3.11. Descriptive statistics of thefts and spatial configuration, correlations (N = 45)

| Descriptive Statistics | | | |
|------------------------|----------|----------------|----|
| | Mean | Std. Deviation | N |
| Thefts | 3.18 | 4.633 | 45 |
| Global Integration | 1.221697 | .2480034 | 45 |
| Local Integration | 2.280422 | .5765218 | 45 |
| Connectivity | 6.69 | 4.252 | 45 |

Table 3.12. Thefts and spatial configuration- syntactic analysis SPSS correlations

| Correlations | | | | | |
|--------------|---------------------|--------|--------------------|-------------------|--------------|
| | | Thefts | Global Integration | Local Integration | Connectivity |
| Thefts | Pearson Correlation | 1 | .379* | .524** | .547** |
| | Sig. (2-tailed) | | .010 | .000 | .000 |
| | N | 45 | 45 | 45 | 45 |

*. Correlation is significant at the 0.05 level (2-tailed).
 **. Correlation is significant at the 0.01 level (2-tailed).

The correlation between thefts and spatial configuration indicate that there is a strong relationship between thefts with connectivity values of streets (0.547**) which is significant in 0.01 level (Table 3.12). Whereas the thefts counts' correlation with local integration is also strong (0.524**) and is significant in 0.01 level. A little differently, the theft count has a low correlation with global integration values of the streets, but still it is statistically significant in 0.05 level. After analyzing and observing the correlations, it has found that the strong relationship was between connectivity values and thefts counts. It is also notable that local integration values have strong correlation with thefts counts. The relationship between variables drape between medium to high values (0.379 to 0.547). The most at the thefts occurred in the main streets of the city, which include variety of activities. They are located in an area that have medium to high local, global integration and connectivity values. However, the little at the crimes occurred in the separated areas, they are located in low local, global integration and connectivity values.

- Correlations between quarrels and other variables (N = 45)

The table shows the correlation between quarrels and "global integration, local integration and connectivity values" through SPSS.

Table 3.13. Descriptive statistics of quarrels and spatial configuration, correlations (N = 45)

| Descriptive Statistics | | | |
|------------------------|----------|----------------|----|
| | Mean | Std. Deviation | N |
| Quarrels | 2.49 | 4.283 | 45 |
| Global Integration | 1.221697 | .2480034 | 45 |
| Local Integration | 2.280422 | .5765218 | 45 |
| Connectivity | 6.69 | 4.252 | 45 |

Table 3.14. Quarrels and spatial configuration- syntactic analysis SPSS correlations

| Correlations | | | | | |
|--------------|---------------------|----------|--------------------|-------------------|--------------|
| | | Quarrels | Global Integration | Local Integration | Connectivity |
| Quarrels | Pearson Correlation | 1 | .400** | .554** | .609** |
| | Sig. (2-tailed) | | .007 | .000 | .000 |
| | N | 45 | 45 | 45 | 45 |

** . Correlation is significant at the 0.01 level (2-tailed).

The correlation between quarrels and spatial configuration indicate that there is a strong relationship between quarrels with connectivity values of streets (0.609**) which is significant in 0.01 level (Table 3.14). Whereas the quarrels counts' correlation with local integration is also strong (0.554**) and is significant in 0.01 level. A little differently, the quarrels count has a medium correlation with global integration values of the streets, it is also statistically significant in 0.01 level. In spite of, observing the correlations, it has found that the strong relationship were between connectivity values, local integration values and quarrels counts. The relationship between variables drape between medium to high values (0.400 to 0.609). As mentioned previously, the crimes occurred in an area that have the medium to high local integration values and connectivity values, the quarrels crimes are increasing to more crowded areas of pedestrian and vehicle.

- Correlations between drugs and other variables (N = 45)

The table shows the correlation between drugs and "global integration, local integration and connectivity values " through SPSS.

Table 3.15. Descriptive statistics of drugs and spatial configuration, correlations (N = 45)

| Descriptive Statistics | | | |
|------------------------|----------|----------------|----|
| | Mean | Std. Deviation | N |
| Drugs | .96 | 1.595 | 45 |
| Global Integration | 1.221697 | .2480034 | 45 |
| Local Integration | 2.280422 | .5765218 | 45 |
| Connectivity | 6.69 | 4.252 | 45 |

Table 3.16. Drugs and spatial configuration- syntactic analysis SPSS correlations

| Correlations | | | | | |
|--------------|---------------------|-------|--------------------|-------------------|--------------|
| | | Drugs | Global Integration | Local Integration | Connectivity |
| Drugs | Pearson Correlation | 1 | -.344* | -.540** | -.398** |
| | Sig. (2-tailed) | | .021 | .000 | .007 |
| | N | 45 | 45 | 45 | 45 |

*. Correlation is significant at the 0.05 level (2-tailed).
 **. Correlation is significant at the 0.01 level (2-tailed).

The correlation between drugs crimes and spatial configuration indicate that there is negative relationship between drugs crimes with connectivity values of streets (-.398**) which is significant in 0.01 level. Whereas the drugs crimes counts' negative correlation with local integration is also strong (-.540**) and is significant in 0.01 level. The drugs crimes count has a low negative correlation with global integration values of the streets (-.344*), but still it is statistically significant in 0.05 level (Table 3.16). After notable the correlations, it has found that the strongest relationship was between local integration values and drugs crimes counts. There are statistically significant medium to high values negative correlations between drugs and other variables (-.344 to -.540). When the movement of people is less, this type of crime increases. In the study area confirms this crime that had low connectivity and integration values, also are located in separate areas, whereas decrease the movement of pedestrian traffic and vehicle traffic. Most crimes occurred in areas with low local

integration, which is within residential neighborhoods. Only in some cases the crimes registered in the streets of medium local integration (Figure 3-25), but these crimes usually occurred in isolated environments.



Figure 3-26 Drug Crime and Local Integration

- Correlations between kidnaps and other variables (N = 45)

The table shows the correlation between kidnaps and "global integration, local integration and connectivity values" through SPSS.

Table 3.17. Descriptive statistics of kidnaps and spatial configuration, correlations (N = 45)

| Descriptive Statistics | | | |
|------------------------|----------|----------------|----|
| | Mean | Std. Deviation | N |
| Kidnaps | .42 | .988 | 45 |
| Global Integration | 1.221697 | .2480034 | 45 |
| Local Integration | 2.280422 | .5765218 | 45 |
| Connectivity | 6.69 | 4.252 | 45 |

Table 3.18. Kidnaps and spatial configuration- syntactic analysis SPSS correlations

| Correlations | | | | | |
|--------------|---------------------|---------|--------------------|-------------------|--------------|
| | | Kidnaps | Global Integration | Local Integration | Connectivity |
| Kidnaps | Pearson Correlation | 1 | .288 | .335* | .324* |
| | Sig. (2-tailed) | | .055 | .024 | .030 |
| | N | 45 | 45 | 45 | 45 |

*. Correlation is significant at the 0.05 level (2-tailed).
 **. Correlation is significant at the 0.01 level (2-tailed).

According to the correlation test there is a significant positive relationship between kidnapping crime and spatial configuration of the streets. The results show that both local integration (0.335*) and connectivity values (0.324*) have low correlation with kidnapping counts which are significant in the 0.05 level. On the other hand, only for kidnapping crimes no correlation was found between crime counts and global integration values. These results show that if a street's first degree connections to other streets are high, this street is selected for kidnapping. Also the results indicate that a streets relationship to the whole configurational system is not effective on the kidnapping crime or kidnapper's choice. Kidnappers seem choice streets that have more number of connections to other side streets.

- Correlations between big crimes "murder" and other variables (N = 45)

The table shows the correlation between big crimes and "global integration, local integration and connectivity values" through SPSS.

Table 3.19. Descriptive statistics of big crimes and spatial configuration, correlations (N = 45)

| Descriptive Statistics | | | |
|------------------------|----------|----------------|----|
| | Mean | Std. Deviation | N |
| Big crimes | .29 | .458 | 45 |
| Global Integration | 1.221697 | .2480034 | 45 |
| Local Integration | 2.280422 | .5765218 | 45 |
| Connectivity | 6.69 | 4.252 | 45 |

Table 3.20. Big crimes and spatial configuration- syntactic analysis SPSS correlations

| Correlations | | | | | |
|--------------|---------------------|-----------|--------------------|-------------------|--------------|
| | | Big crime | Global Integration | Local Integration | Connectivity |
| Big crimes | Pearson Correlation | 1 | .133 | .195 | .140 |
| | Sig. (2-tailed) | | .383 | .200 | .357 |
| | N | 45 | 45 | 45 | 45 |

** . Correlation is significant at the 0.01 level (2-tailed).

The relationship of big crimes "murders" with spatial configuration and correlations between all variables there is no particular pattern of such crimes, or they do not occur any specific environment. And thus there is no significant correlation between big crime counts and syntactic values.

4. CONCLUSION

It is important to achieve security and environmental tranquillity while planning and construction cities. This emphasizes the need to provide stable physical and social surroundings, through which a resident can enjoy a healthy environment far from social unrest and imbalance. Therefore, urban planning is an essential part of a broad social program.

Most of the city's neighbourhoods lack the implementation of design and planning standards. The present study highlighted the importance of its application to reduce crime opportunities and raise the level of security in neighbourhoods and street networks.

Spatial syntax techniques have recently been used to help understand how space will be experienced. They have just been dragged to help portray the flow of crime in metropolitan areas. Precisely like the sensible structure of Jacobs, Hillier as the creator of this speculation, announces that "intolerable deformed the grid", in addition, that the external confronting pieces are the characteristics of the spatial configurations that eliminate the crime of urban areas. However, space syntax methodology has provided us a valuable tool that can assist in improving the ability to predict high and low crime areas.

From the study of the street networks, spatial configuration and crime rates in the city of Al-Khums gave adequate details and accurate findings. The results showed that there is a strong correlation between the space syntax and crime rates. In the scope of places of crime occurrence in Al-Khums city, this means that combining these two methods is strong and useful in analysing crime urban space relationship.

In the city of Al-Khums, the space syntax theory and crime rates showed a positive relationship to the city's street networks. The main streets of Al-Khums city have the highest values of integration and connectivity, as well as the highest values of crime rates.

In the first place, the 17th February Street, has the highest integration, and the connectivity values and the highest values of crime rates, represented as theft and quarrels.

In the second place, Coastal Road and Ben Juha Street, had high values in integration and connectivity and high values in theft crimes, Lebda Street also came with high integration values, while the connectivity was low, yet with high theft and quarrels values.

In third place, Tripoli Street and Al-Harati Street, had medium theft crimes, Tripoli Street had high values for integration and connectivity, while Al-Harati street had medium values integration and connectivity.

The highest crime rate in Al-Khums city is represented in commercial, governmental and administrative areas, and these areas had the highest values of integration and connectivity, and are the most densely populated areas for vehicles and pedestrians.

However, drug crimes occurred in residential areas that had low integration and connectivity values; and this indicate that type of crime requires a low density of people.

The statistical analysis;

- Showed a strong and high correlation between total crime and connectivity values, and a strong correlation between total crime and local integration values. Whereas a low correlation between total crime and global integration values is found.
- The relationship between thefts, connectivity and local integration values are strong correlations, while there is a low correlation between thefts and global integration values.
- The relationship between quarrels, connectivity and local integration values are significant strong correlations, the quarrels count has a medium correlation with global integration values.
- The relationship between drugs, connectivity and local integration have strong negative correlations, The drugs crimes has a low negative correlation with global integration values.

- The relationship between kidnaps, connectivity and local integration are low correlations, and there is no significant correlation between kidnaps and global integration.
- There is no a significant correlation between big crimes and syntactic values.

Al-Khums city is one of the coastal cities close to the capital of Tripoli, and this city has a high population. This city is predominantly populated by various Libyan cities, they are not native inhabitants of the city. After all these results, the city is spread with crimes in late years due to the current security situation in Libya. Moreover, the city has not seen any schematic development of the networks streets and buildings, Which has increased the number of populations, and the city on the same, which has negatively affected the increase in the number of crimes in the city. The effects of the social and economic aspects are one of the reasons for the increase in crime. The prevalence of crime was noticeable among youths with the low education, that did not exceed the intermediate stage. The perpetrators of crimes were of the unemployed individuals.

4.1. Recommendations

The results procured from this study puts forth the following recommendations for the improvement of the Al-Khums city:

- Expansion procedure requires further studies focusing on the residential, social and economic characteristics and their relationship to crime in the city.
- The main streets of the city are the streets where most of the crimes have been occurred, there should be a futuristic view of the re-planning of the street network, that needs to emphasize the importance of highlighting the urban design (which was neglected in the previous stages).
- It should be considered that the residential areas that times here occurred, must be re-planned for the area, taking into account the quality of the spatial distribution of all residential functions, the various daily services uses, and the re-planning of the street networks; as well as the urban design of public open spaces, and green areas.
- The involvement the inhabitants in the fight against crime should be always considered, they maintain security in their neighbourhoods as eyes to observe the streets. This reduces the chances of committing crime, by watching them

the possibility to participate in observation, observing strangers and suspicious activities in their neighbourhoods should be given to people.

- The areas experiencing deterioration in economic and social conditions, needs a futuristic and schematic look, and functional redistribution of land use in the city, according to the planning and design standards for residential areas, taking into consideration the upgrading of land use efficiency.

4.2. Future Research

- Use of other techniques to study crime and its relationship to urban planning of the city, such as, space syntax theory with the combination of geographical information systems (GIS).
- The study focuses on social and economic factors in the Al-Khums city as well as taking into consideration the cultural and social needs and desires of the residents, and provide a sound environment of criminality.
- The study that considers other environmental factors like light, scale, colour, etc. (the morphology of the city, etc...)

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APPENDIX

Axial maps with where occurred types of crimes as following as:

Axial map of Al-Khums City – Theft in 2016.



Axial map of Al-Khums City - Crime of quarrels in 2016.



Axial map of Al-Khums City – Drugs in 2016.



Axial map line of Al-Khums City - Big Crimes in 2016.



Axial map of Al-Khums City – Kidnaps in 2016.



Axial map of Al-Khums City – The numbers of streets where occurred crimes.

