

Relationship between streets network and land use (retail and commercial areas), Al-Khoms City as case study

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Abstract

Cities are shaped by implement street network, integrating, and planning land use. Cities are growing and change in an uncontrollable way due to growing population as well as political, social, economic and environmental changes. The paper study the phenomenal that, population daily needs impacting on land use function where particular areas could be replaced to be as mixed land use around specific technical and functional characteristics streets network. The study approves the relationship between streets network and mixed land use as well as the value of retail and commercial locations designed for local communities. New planning theories represent mixed land use as an important object to develop an areas maximizing residential, commercial and retail development. The study reviews the history of Libyan Planning Generations development and challenges. The paper discuss Libyan planning and focuses on Al-Khoms city as a cases study, implementing maps to investigate the physical shape of cities by analysis maps and using Space syntax as a tool for data collection. Street network is classified to many category where approved that, collector streets are more desirable than other streets for implementing retail and commercial areas. The research shows, a high network connectivity spaces are more attractive to implement mixed land use particularly retail and commercial uses.

Key words: street network, land use, connectivity, urban theories retail and commercial, Libyan urban planning history, Space Syntax.

علاقة شبكة الطرق والشوارع باستعمالات الأراضي (الاستعمال التجاري والبيع

بالتجزئة) حالة دراسة مدينة الخمس

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الملخص

تتشكل و تتكون المدن عن طريق تخطيط شبكة الطرق والشوارع وتوزيع استعمالات الأراضي على المخطط ضمن المناطق الحضرية. تتكون المدن وتزداد حجمها نتجه الي نمو المتزايد لحجم السكان وتتأثر بالعوامل الاجتماعي والاقتصادي والبيئي والسياسي الذي يرسم سياسة التخطيط المدن وتكوينها. تكمن أهمية الورقة في إنها تسلط الضوء على احتياجات اليومية للسكان وتأثيرها على تخطيط استعمالات الأراضي حيث اثبت إن تغير بعض الاستعمالات الأراضي مرتبطة وظيفيا بتصنيف شبكة الطرق والشوارع. إن تخطيط وتصميم الاستعمال أقليمي له أهمية كبيرة للمجتمع تكمن أهميته كما هو موضح بالورقة حيث أن النظريات التخطيط أكدت على ضرورة تطبيق مثل هذا الاستعمال. الورقة أيضا ناقشت تاريخ التخطيط في ليبيا وتحديات التي مرت بها وسلطت الضوء على مخطط الخمس لدراسة ظاهرة تغير في استعمالات الأراضي في داخل المخطط. الورقة داعمة الدراسة باستخدام برنامج **Space Syntax** برهنت إن الشوارع الشريانية والأكثر ارتباطا هي الأكثر تحور للاستعمال أقليمي.

الكلمات المفتاحية: شبكة الشوارع، استخدام الأراضي، الاتصال، النظريات الحضرية بالتجزئة والتجارية، تاريخ التخطيط الحضري الليبي، تركيب الفضاء.

Introduction

The concept of urban planning is presented the idea of physical land use and activities, implemented on a master plan to achieve a more rational pattern of future development. Street network plays a significant role in shaping an urban area. Without appropriate or prior planning, cities may grow or change in an uncontrollable way due to increasing population as well as political, social, economic and environmental changes. New planning theories based on the concept of precincts which intended to maximize residential, commercial and retail development [1]. Strategic planning development policy currently supports the need to increase diversity, density, and sustainability due to the growth of population density and activity in existing urban areas [2]. Economic and population growth leads to increasing demand for land, and the construction of new buildings can negatively influence on the identity of an area, which could replace heritage buildings with modern buildings, with a decline of open spaces [3]. A number of key factors are taken into consideration in this paper as follows. First of all, the paper will briefly trace history of mixed land use and it's benefits focusing on retail and commercial land use. Then, the research classifies Libyan Planning Generations and identifies planning issues associating with increasing demand for retail areas at Al-Khoms City. The main focus of this paper study the relationship between street network association with connectivity and mixed land use, focusing on retail and commercial uses by applying Space Syntax software program on Al-Khoms city as case study.

Mixed-use theories

Professional city planners have, since its inception, developed cities based on, mixed-use, density, street network and traditional neighborhood structure [4]. The new urbanism plans such as Transit Oriented Development (TOD), Traditional Neighborhood Design (TND), Pedestrian Pockets, Transit Villages and Urban Villages have continued to advocate livable neighborhoods focusing in urban area [5]. TOD is often reviewed as an encouragement plan toward improving lifestyle by attracting a mix of retail and residential areas

as well as civic activities [6]. The strategic policy redevelopment plan in develop countries supports a more compact and mixed use of urban areas to create a live able environment [7]. Mixed-use is defined as a mix of shops, offices, apartments and homes on site. Mixed-use within neighborhoods, blocks and buildings blends a combination of residential, commercial, cultural, institutional, where those functions are physically and functionally integrated, and that provides pedestrian connections. Functional, a center area has been defined as mix of activities, which it means a distinctive concentration in a certain area [8]. The expression (a mixed-use development) may also be used more specially to refer to a mixed-use real estate a development project and building, complex of buildings, or district of an urban settlement, town or city that is developed for mixed land use [9]. As showing in figures (1-2).



Figure1. Mixed land use definition

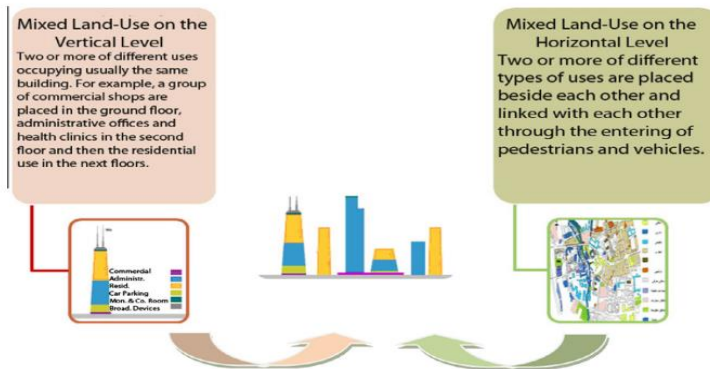


Figure 1. Mixed land use definition [10].

The planners have been recommended benefits of mixed land use zone include, reduced distances between housing, workplaces, retail businesses, and other destinations as well as more compact development and stronger neighborhood character [11]. Indeed, the research indicates that mixed land use is the most important factor for increasing walk ability; because, it provides activities that are needed to support job opportunities. Locating houses, offices, and shops in proximity to each other in a neighborhood improves access for residents and employees [10].

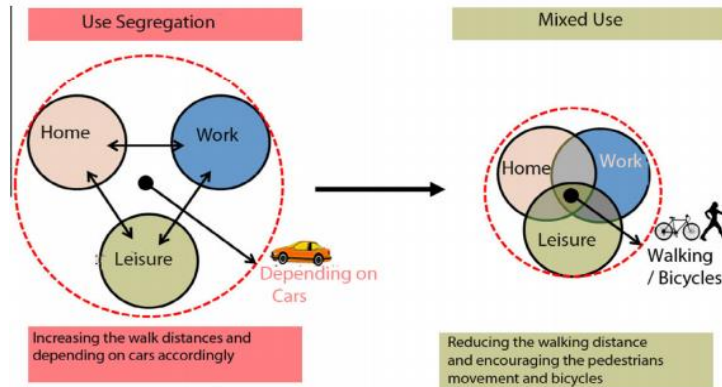


Figure 2. Mixed land use benefit [11]

Background Libyan Urban Planning

The history of master urban stranded during Italian occupation. Indeed, the Turkish administration from 1551 to 1911 left the built-up areas of the towns without proper planning and facilities. Italian Master Urban Plans as a part of their colonization program were prepared for four cites Tripoli, Benghazi, Derna, and Msurata as well as many Layout Plans were prepared for villages. The idea of cites planning is implemented from Garden city theory Ebenezer Howard in 1898. Modern Italian urbanization create a new morphology where are built a new buildings and design a wider streets through demolishing and releasing parts of the old towns. A new houses style, villas and apartments built for Italian families

where residential areas integrated facilities such as water supplies and sewerage systems [12].

The first Master plan of Libyan town after independence was for EL-MARJ town as a result of earthquake destruction in 1963. Libyan government established an independent body called Barca Reconstruction Organization to supervise the construction of EL-Marj new town. American Comp Lubin McGaughy Architects and Consulting Engineers were commissioned to survey and locate as well as design the new town. The company designed area based on concept of Garden City theory development. The planning was influenced by western culture; detached houses with front gardens as well as neighborhood centers with a comprehensive of facilities integrated various services and a grid network of wide streets as an example of concept plan. The second Town Urban Master Plan was EL-Beida with 50,000 inhabitants in 1966. It designed by Doxiadis Associates in first phase a future extension for possible 100,000 inhabitants where it was chosen to be as the capital of Libya city. The Federal Government established to supervise the city's construction and development within the broad guidelines set out [12].

Government awarded four separate contracts to four western consultants for preparation of comprehensive planning program. The program required to report existing condition including economy, resources, population, land use, settlement, community facilities and transportation investigation. Mcgaughy, Marshall, McMillian & Lucan (UK) carried out the study for Muhafadat El-Khoms city and Misurata in addition, seven Master Plans and 25 Layout Plans were prepared by them. By 1970, the four consultants prepared 29 Master Plans and 148 Layout Plans covering the whole country provide information by inventory reports. The planning horizon for the Master plans and Layout Plans was extending until 1988[12].

The program prepared short-term to implementing the plans for the five years period from April 1968 to April 1973, and April 1973 to April 1978. The planning had some of weaknesses including: firstly, the Plans had different growth potential towns in a national context; secondly, during the period of the planning, the economic growth

suddenly because of oil revenues increase. As a result, government seen that, 20 years was probably too long as a time span considering the detailed nature of the plans: Thirdly, Master plans have largely overlooked the possibility of adapting traditional urban styles to the needs of the modern world. The government found it necessary to elaborate new Master and Layout Plans for all settlements in the country up to the year 2000.

Consequently, the Second Generation as a new planning phase emerged and covered the period 1980-2000. The Second national regional planning set up for short-term 5-years and long-term 20-years where four region elaborated including, Benghazi, Tripoli, Sebha and El-Kalij. Polservice Consulting Company was commissioned for Tripoli Region to prepare 33 Master Plans and 46 Layout Plans. However, the third Planning Generation has not yet emerged, which is lead to create a slum cities, land use zoning change, increasing density, car parking problem, increasing car dependency, traffic congestion, unsuitable buildings, lead to inefficient patterns of land uses and unsatisfactory urban environment[13]. Urban streets have conflicts between pedestrian–vehicle traffic need to redesign according to the principles of sustainable urban design that provide facilities and street services. City concept of urban design development has low quality of street urban design and services. Population overgrowth leads to increased demand for land, and the construction of new buildings can negatively influence on the identity of an area, which possibly will replace heritage buildings with modern buildings, with a decline of open spaces [12].

Al-Khoms - Libya

Al-Khoms, is located on the Mediterranean coast about (120 km) east of Tripoli. It is considered as significant sub-region centre (Bladdy) in Tripoli Region in 1980's. The design of the city influence by Arabic culture and Islam civilization. The city is located at altitude of about 5 to 50 m above sea level, within its area of gravity. The Mediterranean Sea forms its northeastern boundary. To the east, the town is limited by the archaeological site of Leptis

Magna and to the south by the planned railway line. The western boundary form by the Wadi, beyond which lied a large site reserved for special purposes. This phenomenon strengthened the functional relations between city and its surrounding areas. The Master Plan-2000 Final Report Plans showed the commerce and business areas cover 2.8% from total area within 8.9 hectares from 318.5 hectares. The Plan report increasing the commerce and business areas plan to be 4.8% to cover 59.6 hectares due to population growth [14].

The city's plan development did not support the mixed-use concept plan in Al-Khoms. It did not give a mixed-use object as priority to propose Second Generation Plan as figures 4 and 5 shows. Most of the commerce and business areas designed to be as a blocks and supermarkets lead to transform city Master Plan due to public needs, where many parts replaced to be retail and commercial areas. However, the retail and commercial areas is located in around some part of the streets where has showing in the following map in figure(6). The numerous of land use changes are happen around main streets where located in privately owned lands.



Figure 3. Existing land use 1980



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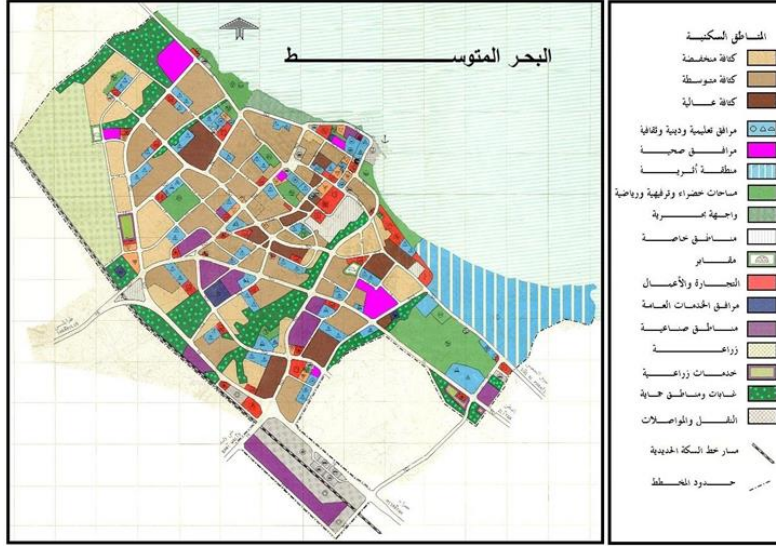


Figure 4. Land use 2000 [14]



Figure 6. Street network and retail and commercial area at AL-Khoms

Libyan planning law has been classified street network. Libyan Planning Act has been classifying the street network, which locate in urban areas as follows:

Table 1. Road Network: Technical and functional characteristics [14]

Category	Functional class	Width of the road reservation m	Number of traffic lines	Design speed km/hr	Function
TE	Expressway	60-70 50-60	2x3 2x3	70-80	Main Traffic between urban districts
TC1	Main Collector road	35-40 30-35 22-25	2x3 2x2 1x4	60	Connections to regional and national roads
TC2	Collector road	30-35 22-25 15-20	2x2 1x4 1x2	50-60	Major traffic within units
TF	Feeder road	20-22 12-15	1x4 1x2	40-50	Local traffic
TA	Access road	10-12	1x2	30-40	Access to blocks and plots

Space syntax

Space syntax is an applications uses for architecture and planning research passed on theories and techniques. The application has invented for urban planning development such as identify streets network connectivity areas linking with study retail and commercial spaces. Space syntax is a significant tool passed on theories and techniques, using for a variety of research areas and applications in architecture and planning specify for urban design, transport and interior design. The software program is used for analysis graphs that allow researchers to get specific data and examining spatial configurations. Bill Hillier and Julienne Hanson visualized the program at London University in late 1970s to early 1980s. The

general idea is that spaces can be broken down into components, analyzed as networks of choices, and then represented as maps and graphs that describe the relative connectivity and integration of those spaces. From the components it is thought to be possible to quantify and describe how simply navigable any space is. The program is useful for the correlation between spatial layouts and social effects such as traffic flow, future land use planning and crime protection [15].

Connectivity

Connectivity is the ability of streets to connect with others. Bill Hillier in 2006 identify connectivity of a street as a number of streets that are directly join with it, which spaces are accessible from every other spaces in the urban area. Connectivity is numerous short links, numerous instructions, creating more accessible and resilient system allowing additional direct travel between destinations [16]. The figure 7 shows that, red lines represent the most connected space and blue lines are not good connected, using the spectrum (red to blue) to explain something in between.

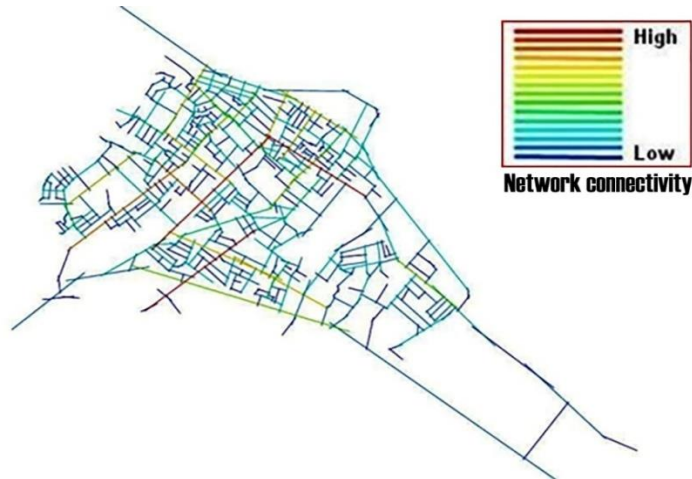


Figure 5. Network Connectivity by using Space Syntax program at Al-Khoms city

Demand for retail and commercial areas have been growing at Al-Khoms city. The city has seen a boom in retail business creating more mixed land use areas. The research study has showing increase retail and commercial areas as the figure 6 shows. The Second Generation map represents business areas as supermarkets. The meantime, the existing map shows business as more retail and commercial areas located in connective streets network, as the figure 5 proves. The main streets residential/commercial – two to five - story buildings with residential units above and commercial units on the ground floor facing the streets. Buildings make a positive contribution to form part of the city relay on the conception and functions. The categorization of streets network also influence on land use that several of changeable land use is located around collector roads and feeder roads, and less changeable land use is located around access road. The common changes are happened in residential areas (private lands) where collector streets are located. The facade of buildings become a mix of shops, offices which extent to which an exterior space is visually bounded by buildings which buildings become visual enclosure. Residential areas influential urban design because their residents wanted from the new area to be as a retail which creates a new identity of the area. The residents recorded that, the main reason for replacing is provide opportunities to rent shops or work in close proximity that provide employment . The software program has specified range of connectivity network spaces and existing map has showing the retail and commercial areas. As a result of comparing space syntax map and existing map, a high network connectivity areas are more attractive to implement mixed land use particularly retail and commercial uses. In fact, the several of change (replacing land use) is happened in residential areas, locating around collector roads more than other. The facade of buildings become a mix of shops, offices which extent to which an exterior space is visually bounded by the buildings. The buildings become visual enclosure. The residential areas influential the urban design because their residents wanted to from the area. They want to be as a retail creating new identity of the area. The residents recorded

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Conclusion

New urbanism theories have been sported providing mixed land use to create more livable areas. In the meantime, the popularity of retail and commercial property as an investment is set to rise further, amidst volatility of local and global financial markets. Studying history of master urban shows that, the population and economic growth as well as social activities needs are the major factories to increase demand for retail and commercial spaces. As map study show that, Master planning increasing the commerce and business areas plan to be more than 4.8% to cover 59.6 hectares. The commerce and business areas designed to be as blocks and supermarkets could crate unlivable area, which destitute for resident daily activities could be transform city Master Plan due to public needs, where many parts replaced to be retail and commercial areas. The numerous of land use changes are happen around main streets where located in privately owned lands. Space syntax is connected to cities urban planning which clarify many phenomena and analysis of urban trends. The connective streets in urban area are more desirable to implement mixed land use particularly retail and commercial uses. The study has given estimation where retail and commercial space should be located to develop urban areas. The future development plan should include up-market residential development, commercial space, public functions in urban areas.

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