The Impact of the distribution of Fuel Stations on the Urban Environment Case Study Kut-Iraq

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Abstract The task of urban planning is to optimize use of land for competing activities in the city, so the successful planning is which maximizes benefits and reduces environmental, social and economic costs through determinants and standards. The use of gas stations is one of the uses of the land supposed to be distributed spatially achieve better efficiency of the city and improve its performance. The research attempts to assess the spatial distribution of the fuel station and how it serves of the Kut city of (within the masterplan border) and the impact of this distribution on the urban structure of the city. It was found that the distribution of stations was inefficient, lacked clear criteria and lacked social justice in distribution, As poor areas are less covered, It adds economic costs as a result of the increase in the number of trips, and length so thus increase pollution of all kinds due to increased traffic volume.

1. Introduction

Fuel stations are important services in cities as they relate to the supply of fuel, which is the basis of urban transport, the distribution of stations is related to justice in the provision of services on the one hand and on the other affects the traffic as the land use is a function of traffic. The significant increase in the number of cars in Iraq after 2003 and the increase in the movement of the society to the increase in the consumption of multiple sources of energy, including transport fuel, this led to confusion in the traffic, which requires studying construction of fuel stations according to population size and to serve the transport system in the city.

There is a decline in the quality of the urban environment in the city of Kut in all its aspects of environmental, social and economic, part of this decline is linked to the poor distribution of land uses, including the distribution of fuel stations, which resulted in congestion in traffic, and congestion around gas stations, led to negative repercussions in all joints of the city.

The study attempts to study the efficiency of the distribution of fuel stations in the city of Kut and the impact of this distribution on the social aspects in terms of justice in distribution as it tries to study the economic effects through traffic in the city of Kut and whether this distribution negatively or positively on this movement.

2. Distribution of fuel stations

Fuel stations are a vital part of land use for transport purposes. They are a source of refuelling, which is the basis of traffic in the streets, so its importance realized from spatial considerations in terms of geographical distribution and spatial location.

Distribution of fuel stations is related to the distribution of services in the city in general and is related to the efficiency of the distribution of services according to approved standards and environmental and...
socio-economic determinants; the social aspect necessitates justice in the distribution of fuel stations across the city.

The use of land affects the traffic through the use of land - transport, which should reduce traffic to the minimum to avoid the economic costs resulting from trips in all aspects (fuel consumption, consumption of spare tools, maintenance of roads ... etc). The increase in the number of trips in turn leads to increased pollution in the city.

3. Fuel stations and distribution services in the city

The primary task of public services is to meet the needs and desires of the population so as to ensure the most equitable distribution, (1,p41), As well as being an important part of the physical structure and urban uses of the population. Therefore, it was necessary to work on distributing and developing them in proportion to the development in the community, The planning of public services means a study of the reality of these services in terms of their location, pattern of distribution, functions, and urban characteristics, and its relationship with the demographic and urban characteristics of the beneficiary grouping so as to ensure the greatest equitable distribution among the population.

The public services are divided into three types of size, the first at the neighbourhood residential level, which includes the services which demand is repeated and on a daily basis, the second at the community level and meets the less frequent needs and the distance to reach them is greater, and the third at the district or city level, (2, p42) The needs are met by rare demand and are close to the city center so often that they are at an appropriate distance from all city residents. There are many factors affecting the distribution of public services, but can be summed up in the first two main factors, first one is natural and second one is human, the natural factor includes the geographical characteristics of the area (site) and also include the relationship with the surrounding area (location).

The human factor includes the density of the population among the neighbourhoods of the city and the importance of services is measured by its ability to meet the needs of the population with the least effort and cost. This requires that the location of the service be close to the centers of population weight, and should take care of the function of the population, the size of the service sector require the largest population area. The above factors must be considered for easy access to the service, which is measured by the spatial importance of any service with the time required or the distance traveled by the individual to access that service, the more well-planned and distributed road network.

4. Distribution of fuel stations

The fuel stations are the most important service facilities for the movement of transport, which can measure the efficiency of the performance of transport networks and assess the reality of traffic and traffic in the city. Therefore, its importance clarify from spatial considerations in terms of geographical distribution and spatial location in terms of the pathways leading to it and beyond, and the impact on the traffic in the street, all these leading to the congestion and traffic accidents and confusion of the traffic when these paths are not well planned, in direct way or in not, (3 p890.

The distribution of fuel stations is subject to the same considerations as the distribution of public services, which are considerations of safety and service together. The fuel stations have been signed in accordance with several criteria and bases established by the competent authorities, including the site of the station on the main street, the area, the distance between the station and the other, taking into account the population size of the city and urban community. The instructed for establishment of petrol stations to the year 2013, must be the plot of land to be built on the main fuel station on the main street, and the area of the station (1000 m²) within the boundaries of the master plan, and out master plan border is (2400 m²). As well as, the rest of the instructions, such as the distance between the stations are standards and must be safety within the station (4).

5. The relationship between land use and transportation

The relationship between the uses of the land use and the transport system has a reciprocal relationship with influence and interaction. As the uses of land and transport are two sides of the same coin affects the use of land on transport and affects the transport of land use, so we find that decisions affecting one of the result affects the other. The use of land and transportation are complementary to each other
and not contradictory, when we say that traffic is a function of land use and transport system, the movement can be explained as an effect for urban land uses. If we know the uses of the land for a particular city then we can predict the movement of trips on the network and the pattern of temporal and spatial distribution. If the land use and the transportation network have changed, there will inevitably be a predictability of the shape and magnitude of the change in movement.

Urban traffic depends on the locations of the activities that supply the services. It is a problem of spatial distribution [5-p78], and that any change in land uses is also reflected in traffic patterns, this is because the locating systems of activities give different types of trips and then traffic in general, if the use of land changes, the city's transportation system will be changed as a direct result. According to transport theory, changes in the transport system can be predicted due to changes in land use. Therefore, urban transport and traffic cannot be planned in isolation from land use planning; therefore, it is possible to dispense with the creation of many expensive roads through proper planning and appropriate locating of land uses [6-441].

Some researchers have highlighted the impact of urban form on trip pattern from another angle namely accessibility, which is an important concept for understanding environmental and social justice as well as economic activity and land value, [7-p8], access is a multi-level concept, not just proximity, but depends on a number of factors, including the location of potential destinations relative to the point of origin, and the effectiveness of the transport system that connects the distribution of sites spatially, [8-p28]. The benefit of accessibility in the first place is to shorten the trip by vehicles or to switch to an alternate mode of transport; more activities available within a specific travel time are those who determine the accessibility of that site. Access is therefore closely linked to land use planning, the use of the transport system for individuals, the characteristics of service facilities, how they are arranged within the city or neighbourhood, and the means of access to these services.

6. The impact of the distribution of fuel stations on the traffic in the city of Kut

The urban form of any city is an important factor in the distribution of land uses and urban form is the spatial pattern or arrangement of individual elements such as buildings and land uses, as well as social groups of economic activities and public institutions within the urban area and the distribution of population and networks that link them. Spatial structure is the spatial distribution of population and uses of land within the urban area, or the pattern of daily trips within the urban area [9]. Urban form is strongly associated with the evolution of the transport system.

In order to develop planning tools that are responsive to a complex interface between transport and land use, it is useful to identify the typical characteristics of development with urban form, the relationship between transport and land uses is complex. Urban form has feedback relationships with transport, and the demand for trips is the first step towards understanding these aspects in the transfer planning process, the city of Kut is divided into five sectors. The northern part of the city comprises two sectors: the center and Damuk, while the southern part (figure 1) of the comprises three sectors: Karamah and Jihad [10- p114].

7. Actual distribution of fuel stations in Kut

The city of Kut contains three fuel stations and is shown in figure (2). The first station is in the center of the city of Kut, the second station near the main terminal, and the third in the south-east entrance (the entrance of the city towards the city of Amara). As we can see, the three stations are located in the northern part of the city. Which is the part that contains most of the administrative, commercial activities and services in the city? Note that these stations were built in the eighties of the last century when the city was small (not exceeding a quarter of its current size). The number of cars also was very limited.
There is no justice in the distribution of fuel stations within the city, if this is compared with the living level of the population (income), with the lowest income population concentrated in the southern part of the city, as shows in figure (3). Which shows the prices of land for the neighbourhoods of the city of Kut, which can be considered an indicator of the distribution of incomes in the city because of the unavailability of official statistics on the distribution of income in the city. Also we notice that Tigris River socially divided the city into poor areas in the south and higher-income areas in the north. That is, there is a clear bias against the poor class at the spatial distribution of fuel stations.

However, although the southern part is less advantaged in the distribution of services and the housing of the lower income class, the two main axes that enter the city come through this part is the entrance of the city towards the city of Nasiriyah and the entrance of the city towards the cities of Nu'maniyah and Husayniyah, see from figure (2). We also note from figure (2) that two of the three stations are located at the axis of Kut - Baghdad and Kut - Basra, which are powerful traffic arteries of the regional transport and transit traffic that runs through the city of Kut. In other words, the service of these two stations is not only the residents of Kut, but also the cars that pass through the city of Kut.
Figure (2) The spatial distribution of fuel stations in the city of Kut on the main traffic axes.

Figure (3) Distribution of per capita income level in the city.
8. Distribution of fuel stations and traffic
The law number 19 of the instructions for the construction of fuel stations for the year 2013, to be the lowest distance between the station and another (15 km) on the same side of the road on the external roads, and not less than 750 m within the borders of the municipalities, (2) km within the borders of the Qada'a and (3) Km within the boundaries of the district between the station and another, the researcher believes that the distance between one station and another should be fixed for all municipalities in the districts, Qada'a and provinces, because the stations will increase with the increase of the city area. The number of stations can be linked to the population standard in the city, ie the number of inhabitants per station.

The application of distances according to instructions, ie 750 meters between the station and the other within the centers of the provinces leads to the construction of a very large number of stations, on the other hand, some aspects of any station will be deprived Nahya'a of the distance requirement of 3 kilometres, which is a very large distance for the areas.

By applying this criterion to the city of Kut and using the buffer analysis in the GIS environment shown in figure (4) we notice that there are large areas of the city that are not covered by this service. The city's need for fuel stations is constantly increasing. In other words, the relationship between the population and the fuel filling stations is a positive one, as the larger the population there is the need to build new stations to meet the daily trips of the population. It is also possible to adopt a sector meter opposite a fuel station. In other words, the city of Kut needs at least five fuel stations because there are five sectors in the city.

![Figure (4) Buffer 2500 meters around the stations actually built](image)

That the shortage cannot be addressed through private investment, because the conditions for the establishment of gas stations in the provinces require an area of not less than 2000 square meters, and these areas within the basic designs of cities belong to the municipality and not the property of people. As indicated in paragraph 13 of the 2013 Construction Instructions Conclusions.

The provincial councils and the municipal council are the main bodies that should be approved for the construction of the stations so they should take after justice in the distribution of stations. And the Directorate of Urban Planning must take its own as one of the parties that agrees on the proposed site, as stipulated in Article IV of the documents required to establish the stations of the instructions referred to.
From figure (4) we note that buffer stations cover small parts of the southern part, but these parts do not benefit from this distance because of the Tigris River as a natural obstacle. The morphology of the city of Kut, along the banks of the river, necessitates that the movement between the two banks through the three bridges, all located in the center of the city, which is already suffering from traffic congestion large. There is a kind of traffic in the city within the city itself and there is a second type of traffic between the city and its regional surroundings, a proportion of the two types of movement occur in the southern part itself or between the southern part and the regional area, in other words, there is a movement that does not require passage into the northern part of the city, but fuel mobilization imposes transit to it. Causing unnecessary traffic and could be avoided with a fuel filling station in the southern part of the city.

9. Conclusion

1. Lack of social justice in the distribution of stations in the northern part of the population highest income.
2. There is a shortage and poor distribution of gas stations in the city of Kut. All stations are located in the northern part of the city
3. Negative economic impacts are causing the increase in number of trips due to fuel stations, which pass through the rivers and cause congestion at the bridges.
4. Negative environmental impact due to pollution and noise resulting from increased number of flights and congestion

10. Recommendations

1. The establishment of fuel stations in the southern part should be accelerated to reduce spatial disparities in the city of Kut and to stimulate the development of this segment and reduce the number of trips caused by the absence of a fuel station.
2. Reduce the environmental damage associated with increasing the number of trips,
3. The research proposed the establishment of three stations as shown in figure (5), located on the main axes of the movement and ensure a good coverage of the city.
4. It is necessary to adopt standards that depend on the population density of the area and the activities available in the region and the need for it, so that spatial distribution to achieve coverage of all parts of the city.
5. City morphology should be taken at the spatial distribution of fuel stations.
6. Review the controls of the Ministry of Oil on the nineteenth paragraph, which defines the distance between the station and another, also the thirteenth paragraph, which specifies the minimum area, does not build the fuel station.
11. Sources

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