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## **The Implications of Traffic Congestion Problem to the Socio-Economic Development of Owerri Urban Area of Imo State, Nigeria**

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### ***Abstract:***

*The study is carried out to examine the traffic congestion problems in Owerri urban area of Imo state with the aim of finding out the major causes and possible solutions to the problem in the area. It will also try to identify various neighborhoods worst hit by the traffic congestion problem and to find out the reasons why these areas are highly vulnerable to traffic congestion. The study made use of both primary and secondary data of field work, oral interview, questionnaire administration, both published and unpublished materials from libraries and internet. A total of 500 copies of questionnaire were administered by a stratified random sampling. Data generated were presented using tables, frequencies and percentages. Analysis of data made use of analysis of variance (ANOVA) and Pearson's product moment correlation coefficient. Two hypotheses were tested at 0.05 or 95 percent confidence limit to authenticate the findings from the generated data. Findings revealed among others that concentration of land use along one axis in Owerri urban accounts for about 56% of the traffic congestion leaving the residual 44% of the causes to other variables. At the end of the study, recommendations were given to improve the situation which includes decentralization of land use in Owerri urban.*

**Keywords:** *Transportation, Urban area, Neighborhood, Owerri, Traffic Congestion*

### **1. Introduction**

Transportation which is the means of moving people, goods, information or ideas from place to place and as such involves not just modes of transportation but also such methods as telegraph, telephone or even television. It thus means that transportation plays a key role and it is essential in socio-economic growth and development of any society, whether it is rural or urban, developed or developing. Therefore the availability of good transportation facilities found in any area determines to a greater extent the degree of accessibility to the people, the delivery of goods and services to the people and the extent to which people communicate with their neighboring areas.

Congestion is relatively easy to recognize. In congestion, roads are filled with cars, trucks and busses, and sidewalks filled with pedestrians. In transportation realm, congestion usually relates to excess of vehicles on a portion of roadway at a particular time resulting in speeds that are slower – sometimes much slower than normal or 'free flow speeds'. Congestion often means stopped or stop - and - go traffic. The congestion of cities and sometimes together with daily activities has brought the problem of traffic congestion, and other transportation problems. Migration and natural increase causing population growth is a major factor of the problem of traffic congestion. This is because large numbers of people in cities are constantly making trips to and from their place of work, shopping and other daily travel demand. For these and other reasons, the high activity rate of this population produces increasing pressure on the existing urban roads. This overexploitation of existing infrastructural facilities manifest in traffic congestion (Bhutan, 1976). Consequently the urban dwellers and transport managers will start experiencing hardship, inefficiency in trip making and transport operations respectively. In order to avoid such economic chaos caused through traffic congestion, there is need to move these populations in large numbers and on time too. To achieve this, an effective road transportation system is needed.

Congestion has not only grown over the past decades, it has become more volatile as well (Lomax, 2005). Congestion levels are never the same from day to day on the same road because the varieties of traffic influencing events that influence congestion are never the same. Due to the fact that travel conditions are so unreliable on congested highways, travelers must plan for these problems by leaving early just to avoid lateness. The development of road and adequate transport facilities facilitates development value to landed properties and makes communication easier.

### *1.1. Statement of the Research Problem*

Traffic congestion which is a condition on road network that occurs as use increases is fast becoming a big problem in Owerri urban area. As a relatively small town, Owerri is not expected to have transportation problem if transportation networks are developed. What has not been identified is the nature of congestion problems being experienced in the city.

Most of the time, movement is paralyzed within the town and often times grinds to a halt. There are so many speculations by different people about the cause of traffic congestion in the city. Some people attribute it to shortage of routes, others blame it on decay of road infrastructure, while many asserts that it is due to indiscipline on the part of road users of the route. Others still attribute it to the concentration of land use within a particular route. What needs to be determined at this stage is the real cause of traffic congestion noticeable in Owerri urban.

Towards the end of 2010 till date, some commuters are regretting the removal of a commercial motorcyclist by the government from the roads in Owerri town. This regret is because commuters that use the public mode of transport are not finding movement easy in terms of getting to ones destination on schedule. What is suggestive of this scenario is either shortage of modes of transport or that the tricycles are inadequate replacement for motorcycles. This raises the issue of therapy that needs to be applied to come to terms with adequate modes required to meet the demand of commuters in Owerri urban area.

Owerri urban is structured into neighborhoods. The neighborhoods include Owerri Nchise, Ikenegbu - Aladimma - federal housing estate, New Owerri- Umuguma World Bank housing estate, Amakohia – Akwakuma axis, Government area, Works layout, Okigwe road – Orji axis and Nekede area. People from these neighborhoods troop into Owerri city on daily basis for their daily activities. A study that focuses on an analysis of transportation problem like congestion should be interested in the analysis of spatio-temporal variation of transport sector among these neighborhoods. This raises the issue of trip generation. Therefore, the axis that generates the greatest volume of congestion and peak time of the congestion needs to be identified here.

### *1.2. Aim and Objectives*

The main aim of this study is to examine the effect of traffic congestion to socioeconomic development in Owerri urban area. The following objectives serve as key elements to achieving the above aim;

1. To ascertain the major causes of traffic congestion in Owerri urban area
2. To identify routes worst hit by congestion and other transportation problems in the urban area
3. To assess the spatial variations in the distribution of traffic congestion in the study area
4. To proffer possible solutions to traffic congestion in Owerri urban area

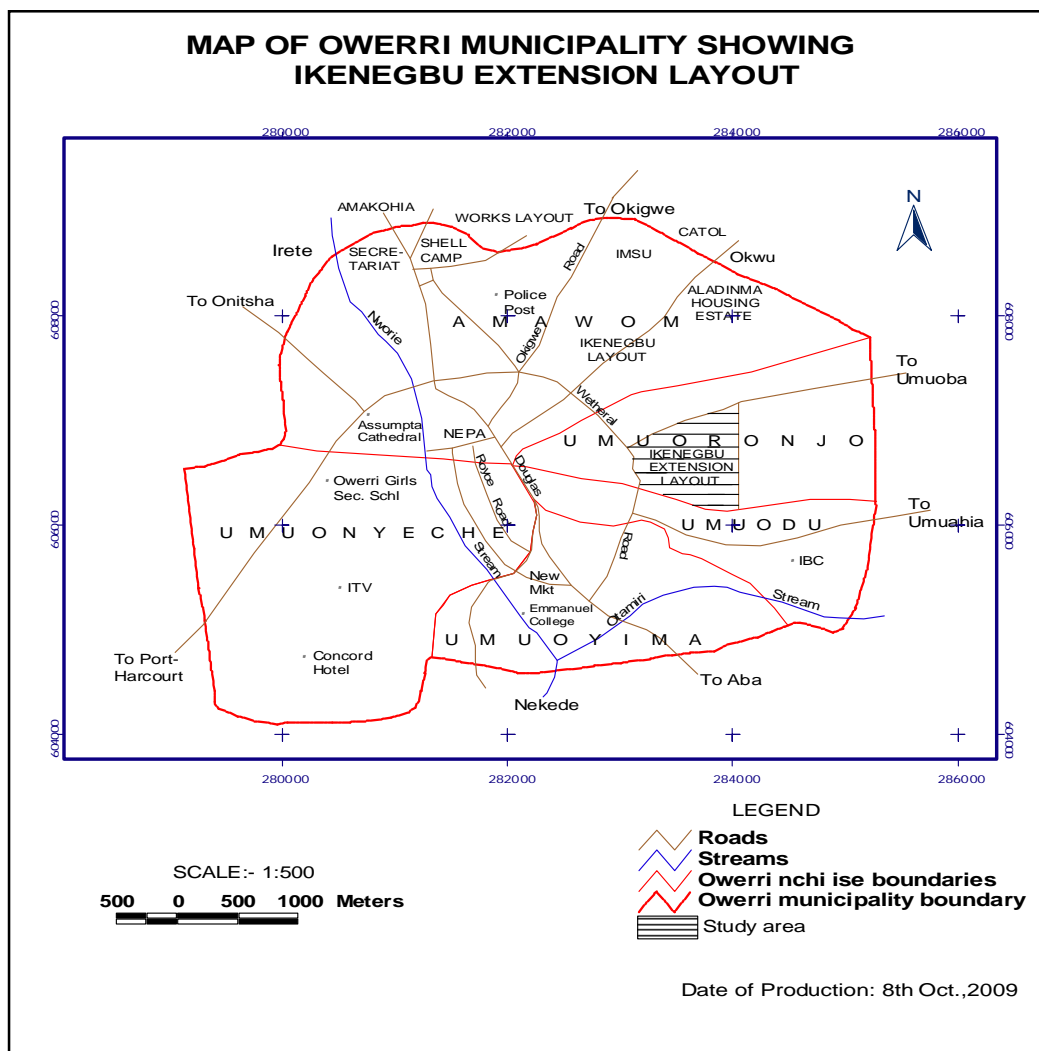
### *1.3. Research Hypotheses*

The following research hypotheses were posited to guide this research

1. Concentration of land uses in the city along one axis is not the major cause of traffic congestion in Owerri Urban.
2. Traffic congestion is not spatially distributed among the neighborhoods in Owerri Urban

## **2. Methodology and Study Area**

Both primary and secondary information were obtained from the field and library through questionnaire, oral interview, basic statistics, textbooks, journals, magazines and published and unpublished materials related to the study were employed. The study area is divided into five neighborhoods. The neighborhoods include Owerri Nchise, Ikenegbu/Aladimma, Amakohia/Akwakuma area, Orji and New Owerri area. Data for this study were generated through sampling. A total of 500 copies of questionnaire were administered. Data generated were presented using frequency tables, percentages and charts, Analysis of Variance (ANOVA), Correlation was used to test the hypotheses.



*Figure1: Map of Owerri Urban*  
*Source: Owerri Capital Development Authority (OCDA), Owerri, 2009*

### 3. Literature Review

Traffic congestion is an itching problem in almost all cities in both developed and developing countries of the world. Traffic congestion is a condition on road network that occurs as use increases, and is characterized by slower speed, longer trip times and increased vehicular queuing. The most common example is the physical use of roads by vehicles. When traffic demand is great enough that the interaction between vehicles slows the speed of traffic system, congestion is incurred. As demand approaches the capacity of the road (or of the intersection along the road), extreme traffic congestion sets in. When vehicles are fully stopped for periods of time, this is colloquially known as traffic jam or snarl-up (Herman, 2006). Traffic congestion occurs when the volume of traffic or modal split generates demand for space greater than the available road capacity; this point is commonly termed saturation. Numerous specific circumstances cause or aggravate congestion. Most of them reduce the capacity of a road at a given point, or over a certain length, or increase the number of vehicles required for a given volume of people or goods. Mayor 2005 states that about half of US traffic congestion is recurring, and is attributed to sheer weight of traffic; most of the rest is attributed to traffic incident, road works and weather event. Traffic congestion occurs in a time and space i.e. it is a spatio-temporal process. Therefore this classification schema of traffic congestion is associated with some common spatiotemporal features of traffic congestion found in measured data. Common spatiotemporal empirical features of traffic congestion are those features which are qualitatively the same for different highways in different countries measured during years of traffic observations. Common features of traffic congestion are independent of weathers, road conditions and road infrastructure, vehicular technology, driver's characteristics, daytime etc.

Mathematical and economic theories have been used to describe the cause of traffic congestion. Some engineers have attempted to apply the rules of fluid dynamics to traffic flow, likening it to flow of a fluid in a pipe. Congestion simulations and real observations have shown that in a heavy but free flowing traffic, jams can arise spontaneously triggered by minor events such as abrupt steering maneuver by single motorist (Nagal and Schreckenberg 1992). Traffic scientists likened such a situation to the sudden freeing of super cooled fluid. Because of poor correlation of theoretical models to actual observed flows, transportation planners and highway engineers attempt to forecast traffic flow using empirical model.

Economist, Anthony Downs argues that rush hour traffic congestion is inevitable because of the benefit of having a relatively standard workday. In capitalist economy, goods can be allocated either by pricing (ability to pay) or by queuing (first come first serve); congestion is an example of the later. Congestion occurs in cities of both developed and developing world. The August 2010 China National Highway 110 traffic jam in Hebei province, China is considered the worst jam ever, as traffic congestion stretched more than 100 kilometers (62miles) from August 14<sup>th</sup> to 26<sup>th</sup> including at least 11 days of total grid lock (Michael Wines 2010). The New York Times called this event the great China Gridlock 2010. In U.K, the inevitability of traffic congestion in some urban road networks have been officially recognized since the Department of Transport set down policies based on the report of traffics in towns in 1963 by stating thus, ‘even when everything that is possible to do by way of building new roads and expanding public transport have been done, there would still be in absence of deliberate limitation more cars trying to move into or within our cities than would possibly be accommodated’. The department of transport sees growing congestion as one of the most serious problems facing the U.K. Finally, traffic congestion has so many negative impacts; wasting time of motorists and passengers (opportunity cost) as congestion reduces economic health. Delays, which may result in late arrival for appointment, meetings, and education resulting in lost businesses, disciplinary action or other personal losses. Inability to forecast travel time accurately, leads to drivers allocating more time to travel, ‘just in case’ and less time on productive activities. Emergencies are equally affected as blocked traffic may interfere with passage of emergency vehicles such as ambulances and police vehicles travelling to their destination where they are urgently needed. Spillover effect from congested main roads to secondary roads and side streets may affect neighborhood amenity and real estates.

#### 4. Discussions and Findings

Five neighborhoods were selected through sampling for the pilot survey in Owerri urban and copies of questionnaire were distributed equally. One hundred copies of questionnaire were distributed to each of the neighborhoods as seen in Table 1

Neighborhood	Frequency	Percentage Frequency	Number Retrieved	Percentage Retrieved
New Owerri Area	100	20	95	19
Amakohia Axis	100	20	90	18
Ikenegbu/Aladimma	100	20	98	19.6
Owerri Nchise	100	20	96	19.2
Orji	100	20	100	20
<b>Total</b>	<b>500</b>	<b>100</b>	<b>479</b>	<b>95.8</b>

Table 1: Questionnaire Distribution to the Neighborhoods

Source: Author's Fieldwork, 2014

##### 4.1. Major Causes of Traffic Congestion in Owerri Urban

Previous works has shown that congestion is as a result of seven root causes interacting with one another. They are physical bottleneck (capacity), traffic incidents, work zones, weather, traffic control devices, special events and fluctuations of normal traffic. Owerri urban centre is always afflicted with traffic congestion problems. The residents responses to question on what they think are the major causes of traffic congestion in the area is presented in Table 2

	Neighborhood					Total
	New Owerri	Amakohia	Ikenegbu/Aladimma	Owerri Nchise	Orji	
So many junctions in area	26	3	36	7	30	102
Blockage of routes by refuse	8	10	8	10	4	40
Very narrow roads	6	12	2	6	08	34
Inadequate routes and streets	21	40	24	24	36	145
Inadequate modes	4	2	3	25	2	36
Street trading in major roads	11	8	6	10	4	39
Absence of pedestrian ways	17	12	15	8	10	62
Too many private Vehicles	2	3	4	6	6	21
<b>Total</b>	<b>95</b>	<b>90</b>	<b>98</b>	<b>96</b>	<b>100</b>	<b>479</b>

Table 2: Major Causes of Traffic Congestion in Owerri

Source: Author's Fieldwork, 2014

The data in Table 2 reveals that two major problems are the root causes of traffic congestion in Owerri urban. They are: too many junctions in the study area which is represented by 102 respondents or 21.3 percent of the sample size, and inadequate routes and streets as observed by 145 respondents or 30.3 percent of the sample population. Together these two make up 247 respondents or about 56.1 percent of the sample population. They are followed distantly by absence of pedestrian walkways by 62 respondents or 12.94 percent of the sample size. Other major causes of traffic congestion in Owerri urban can be seen in Table 2. Studies of spatial

distribution of traffic congestion in Owerri urban shows that while too many junctions bug people of Ikenegbu/Aladimma and Orji, inadequate routes and streets is the major cause of traffic congestion in Amakohia axis.

#### 4.2. Routes Worst Hit by Traffic Congestion in Owerri Urban

To ascertain the spatial variation of congestion among routes in Owerri urban, the residents were asked to indicate the routes where they experience worst traffic congestion in the course of their daily activities. Their responses are presented in Table 3.

ROUTES	New Owerri	Amakohia	Ikenegbu/Aladimma	Owerri Nchise	Orji	Total	Percentage
Douglas Road	30	26	28	31	29	144	30.1
Whethral Road	7	9	17	15	8	56	11.7
Okigwe/orji Road	6	10	11	9	15	51	10.7
Orlu Road	09	14	5	10	10	48	10.0
Mbaise Road	5	2	3	3	6	19	4.0
Egbu Road	2	3	4	2	3	14	2.0
Bank Road	21	18	20	19	18	106	22.1
Assumpta/PH Road	15	08	10	09	11	53	11.1
Total	95	90	98	96	100	479	100

Table 3: Worst Traffic Congestion Routes in Owerri  
Source: Authors' Field work, 2014

The data on Table 3 reveals that Douglas road and Bank roads are the routes in Owerri urban that experience worst traffic congestion as indicated by 250 respondents or 52.2 percent of the sample population. The reason as pointed out by the respondents is because of the strategic location of these areas. People in large numbers pass these roads before getting to their workplace at federal and state secretariat in Port Harcourt road. Secondly, the location of most banks without adequate parking spaces force customers to park along the routes thereby increasing congestion in this area. Next is Whethral road which is at the heart of the city. This route takes 56 respondents or 11.7 of the sample population. Other routes that experience some degrees of traffic congestion in Owerri urban are Okigwe road, Orlu road, Assumpta road, Mbaise road and Egbu road with percentage ratios of 10.7, 10.0, 11.1, 4.0 and 2. percent respectively. In addition to causes of traffic congestion outlined in Table 2, the location of socio economic activities along these routes which result in influx of humans and vehicles along these areas also enhances the degree of congestion in these routes. The socio economic institutions located along these routes are as follows; two major markets in the area (Ekeukwu and Old market) in Douglas road; Banks and business centers in Bank road; Federal and State secretariat in Assumpta/Port Harcourt road; Imo State University and some state ministries in Okigwe Road; Alvan Ikoku Federal College of Education and some department of state ministries in Orlu road.

From the analysis, it is clear that Douglas road has been identified as the route worst hit by traffic congestion. A study of spatial distribution of traffic congestion in Owerri urban area as based in Table 3 shows that the routes where people spend most of their travel time in Owerri urban is Douglas road according to 144 of 479 respondents.

#### 4.3. Possible Solution to Improve Traffic Flow in Owerri Urban

In answering the question on the best ways to improve the flow of traffic in Owerri urban, the responses of the respondents are tabulated in Table 4

Possible Solutions	New Owerri	Amakohia	Ikenegbu/Aladimma	Owerri Nchise	Orji	Total	Percentage
Decentralize Land Use	21	28	24	32	25	130	27.1
Stop Police from checkpoints	7	6	7	3	7	30	6.3
Widening the roads/repairing the bad ones	23	18	16	20	18	95	19.8
Provision of accessible link routes	20	23	30	18	34	125	26.1
Remove Tricycle from roads	17	8	7	12	6	50	10.4
Put Traffic lights	3	3	9	6	8	29	6.1
Remove Traffic lights	4	4	5	8	2	23	4.8
Total	95	90	98	96	100	479	100

Table 4: Solutions to Congestion Problems in Owerri Urban Neighborhoods  
Source: Author's Fieldwork, 2014

Analysis of the information in Table 4 shows that decentralization of land use and provision of accessible link routes in Owerri urban area will solve more than 50 percent of traffic congestion observed in the area. This is because the two parameters added together take about 255 of the 479 respondents or percentage ratio of 53.2 of the sample population. Provision of accessible link routes will allow road users to take alternative routes instead of congesting in few motor able ones Another solution mechanism indicated by the respondents that will go a long way in solving traffic congestion problem in Owerri urban area is widening the available roads in the area and repairing the bad ones as most

of the available routes are narrow and in bad condition. This suggestion was given by about 19.8 percent of the respondents. Other traffic congestion solution in Owerri urban that will help to improve the rate of traffic flow as indicated by the respondents include removing tricycle from the major roads and streets (10.4 percent), stopping police check points from major roads and streets (6.3 percent), installing traffic lights in some areas (6.1 percent) and removing traffic lights from some area (4.8 percent). From the foregoing, it is clear that the decentralization of land use, provision of accessible link routes and widening of roads in Owerri urban area are the most important viable means that will help in solving traffic congestion in the study area.

Therefore this study is of the view that these three solutions/ measures will reduce about 73 percent of traffic congestion in Owerri urban.

## 5. Data Analysis

This section analyzed the data and tested the stated hypotheses. The first hypothesis states that the major cause of traffic congestion in Owerri urban is not the concentration of land uses in one axis. To test this hypothesis, data in Table 2 and 3 were subjected to Pearson's Product Moment Correlation Model. The computation is an indicative that the Correlation Coefficient between the main cause of traffic congestion in Owerri and routes used by commuters to assess their destination is 0.7492. This is a high positive relationship. It also meant that the more the routes coverage, the more traffic congestion becomes acute. The coefficient of determination ( $r^2$ ) is 0.5613, symbolizing that the routes used by commuters accounts for 56 percent of the traffic congestion noticeable in Owerri urban routes. This leaves a residual of 44 percent attributed to other variables.

To find out the authenticity of this result, the regression result is subjected to t-test. The computed t- statistic is 2.77. It was hypothesized that the concentration of land uses along one axis in Owerri urban is not the major cause of traffic congestion within the city. Testing at 95 percent confidence limit at 6 degrees of freedom, the critical value is 1.86. The null hypothesis is therefore rejected because the t- statistic is greater than the critical value. Consequently, it is upheld that concentration of land use in one axis is the major cause of traffic congestion in Owerri urban.

The second hypothesis states that traffic congestion is not spatially distributed among the neighborhood in Owerri Urban Area. The computation of the data is an indication of neighborhoods and their degree of congestion. The data on Table 3 is subjected to Analysis of Variance statistic model. The computed F- Ratio was 18.7. Testing at 95 percent confidence limit at 4/34 degrees of freedom, the critical value is 2.61. The test indicates that the calculated F-Ratio is greater than the critical value. The null hypothesis is rejected and it is affirmed that traffic congestion is spatially distributed within the neighborhood of Owerri urban.

## 6. Conclusion and Recommendation

Congestion can be reduced by either increasing road capacity (supply), or reducing traffic (demand). Capacity can be increased in a number of ways, but need to take account of latent demand; otherwise it may be used more strongly than anticipated. Increased supply can include adding more capacity at bottlenecks (such as by adding more lanes at the expense of safety zones, or by removing local obstacles like bridge support and widening tunnels), adding more capacity over the whole of a route, creating new routes and traffic management improvement. Urban planning and urban design practices can have a huge impact on level of future traffic congestion, though they are of limited relevance for a short term change. Reduction of demand can include parking restrictions, reduction of road capacity to force traffic onto other travel modes. Methods here include traffic calming and share space concept.

### 6.1. Recommendation

Having analyzed some traffic congestion issues in Owerri urban area and making some findings, the following recommendations have been offered

1. Enforcement of Traffic Rules and Regulations: Transportation facilities are not only about roads, traffic signs and signals are also inclusive. Government should ensure strict enforcement of traffic rules and regulations on all roads to minimize excesses of the road users, drivers and motorists who disobey the rules and regulations
2. Owerri urban area should be decentralized by opening up and developing new areas and decentralizing economic activities to those areas
3. New routes should be built, existing ones widened and dilapidated roads and streets repaired to allow free flow of traffic.

## 7. References

- i. Bhutan, (1976): 'The Development Process', London Hutchinson and Co.
- ii. Chibo, C. N and F.C Okorie (2010): Transport Constraints in Goods and Services Delivery in Rural parts of Imo State. Paper presented at Rural Development Seminar held in Imo State University Auditorium.
- iii. Hermann, K (2006): A New Way to Organize Parking: The Key to Successful Sustainable Transport
- iv. System for Future, Environment and Urbanization (International Institute for Environment and Development) vol.18 pg 387-400
- v. Hervey, (1973): Highway Engineering, New York, John Wiley and sons, Hutchinson B.G (1974): Principles of Urban Transport System Planning, Washington DC
- vi. Jonathan, W (2008): Gridlock is a way of Life for Chinese, www.guardian.co.uk/world/2010/aug/24/china
- vii. Mayor, L (2005): From NAIOP'S website, Tamba Bay, United States of America
- viii. Michael, W (2010): Chinas Growth Leads to Problems down the Road, New York Times
- ix. Nagal, K and M, Schreckenberg (1992): A Cellular Automation Model for Freeway Traffic, Journal de physique 1, 2 2221-2229
- x. Noble, J.C (1966): Residential Roads and Footpaths, Histo, London
- xi. Schrank, D and Lomax, T (2005): Urban Mobility Report, Texas Transportation Institute
- xii. Thompson M.J (1978): Great Cities and their Traffic, England Penguin Books Limited