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Rising Car Ownership and Traffic Congestion in the University of Cape Coast Campus

Oscar Agyemang Opoku[1*], Obiri Yeboah[2], Ernest Gyamfi[3], George Afful[4]

[1]PhD Geography, Candidate University of Cape Coast, Ghana*
[2]Mphil Geography University of Cape Coast, Ghana
[3]Msc. Transportation Planning, Kwame Nkrumah University of Science and Technology, Ghana
[4]B.A. Social Sciences University of Cape Coast, Ghana

Corresponding Email: [1]oscar.opoku@stu.ucc.edu.gh*

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Abstract: ***The study sought to examine the effects of rising car ownership on traffic congestion in the University of Cape Coast. The study used a quantitative and descriptive design of which convenience sampling was used to select 250 respondents (senior members, workers (TEWU), students (private car owners), commercial taxi drivers, shuttle drivers as well as minibus drivers). Questionnaire and structured interviews were the main data collection instruments used. The data was then analysed with the help of Statistical Product for Service Solution using percentages and frequencies and presented by using tables and charts using Excel 2020 version. However, the responses from the interviews were transcribed verbatim and discussed thematically based on the objectives of the study. It was found out that rising car ownership on campus influences road traffic congestion on campus. Also, road traffic congestion waste people's time, delay movements, increase local temperature, increase expenses on fuel, low productivity and road accidents. Moreover, private cars and taxis were the type of cars used by majority of the respondents. It was also found that rise in car ownership, especially private cars, taxis, minibuses and shuttle buses were the major cause of road traffic congestion on campus. It is, therefore, recommended that the transport section of the University should provide enough spaces on campus for car stopping and parking. Lastly, the transport section of the University should educate the car users on campus on the essence of traffic regulators and others.***

Keywords: Traffic Congestion, Car Rising, Car Ownership, University of Cape Coast.

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1. INTRODUCTION

Since the earliest large human settlements, cities, and traffic have evolved in lockstep, the same forces that attract residents to dense urban areas also contribute to sometimes intolerable levels of traffic congestion on city streets and thoroughfares. Effective urban governance necessitates a careful trade-off between the advantages of agglomeration and the drawbacks of excessive congestion. Congestion is a problem in all large and growing urban areas (Shekhar & Saharkar, 2013). Every nation's goal is to improve its citizens' social and economic well-being. The government's long-term goal is to raise the standard of living for all Ghanaians to that of a middle-income economy. Transportation is a fundamental economic and social necessity that comes to mind when discussing economic and social development. Transportation is a life process activity that aims to provide access to a variety of activities that meet humanity's mobility needs (Arasan, 2012).

According to Eddington (2006), and efficient transportation system is critical for sustaining economic growth in contemporary economies because it connects various parts of the country to the rest of the world. It connects people to jobs, gets products to market, supports logistics and supply chains, and facilitates domestic and international trade. Not only is a well-developed transportation system critical for national growth, but it also acts as a catalyst for economic development in a country. Thus, transportation and productivity are positively correlated (Lu et al. 2009). At the individual level, Wane (2001, p.1) notes that "transportation is a critical vector for urban insertion because it facilitates economic activity, family life, and social network formation." It connects the various urban spaces where an individual or family must carry out their tridimensional life strategy (i.e. family, work, residence). Thus, urban mobility is at the heart of the issues that any city dweller faces. ”

As a result, cities throughout the world had experienced tremendous motorisation in the last century, particularly since 1988, when the global car population surpassed 400 million (Walsh, 1990). According to Dimitriou (1990), this phenomenon occurs because few activities are more poorly managed than urban transportation in both developed and developing countries. As a result of public transportation's inability to meet travelers' needs, the demand for private automobiles has increased.

Due to this high level of motorisation, in combination with insufficient traffic management strategies, an ageing and poorly maintained vehicle fleet, and insufficient land use and transportation planning, particularly in Developing Economies, modern cities have seen a disproportionate amount of traffic congestion (Agyemeng, 2009). Congestion is defined as an increase in the disruption of traffic movement on a particular element of the transportation system. It is most visible when the level of demand for a particular mode of transport exceeds the facility's current capacity (Taylor, 1999). That is, traffic congestion results in queuing, slower speeds, and longer travel times, all of which impose costs on the economy and have a multiplicity of negative consequences for urban regions and their residents, as Shekhar and Saharkar (2013) articulated. Although traffic congestion exists in the majority of the world's major cities, there is no universally

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accepted definition. Congestion occurs when the number of vehicles on the road exceeds the capacity of the available road space, preventing traffic from moving efficiently (VAGO, 2013).
According to Rodrique et al. (2009), congestion can be viewed as an inevitable result of scarce transportation facilities such as road space, parking lots, traffic signals, and effective traffic management. They argued that urban congestion is primarily a problem for two distinct modes of transportation: passengers and freight that share the same infrastructure. Thus, traffic congestion on road networks occurs as a result of excessive use of road infrastructure beyond its capacity and is manifested by slower speeds, longer trip times, and increased vehicular queuing (Takyi et al., 2013). Traffic is a sign of economic vitality and mobility. Excessive congestion, on the other hand, has a variety of negative consequences. It has also erected an artificial barrier to the efficient flow of goods and people along our highways that connect major cities (Popoola, Abiola & Adeniji, 2013). It imposes costs on individuals, communities, and businesses in the form of longer, less predictable travel times; lost productivity and increased vehicle operating costs; increased pollution, noise, loss of amenity, and driver stress; and decreased time spent with family members (VAGO, 2013).

Congestion has become a common characteristic of urban road transportation systems in developing countries, resulting in increased operating costs, user productivity loss, and increased fuel consumption, among other consequences (World Bank, 2002). To begin, there are numerous and interconnected factors that contribute to vehicle traffic congestion, such as rapid urbanisation, which concentrates people and economic activity in urban areas or cities. Second, as a result of urban areas' dispersed but interconnected land-use patterns or specialisations in certain activities, for example, workforce concentration in some areas, residential and recreational areas in other distant locations, people are forced to move between them. Thirdly, there is a mismatch between supply and demand; this is particularly acute during peak hours, when the majority of people begin and end their work at the same time—in the mornings and evenings (Alan, 1995).
Congestion is becoming a more serious problem in Cape Coast Metropolis from time to time due to a variety of factors, including population growth—in addition to natural growth—and the pull factor that draws people from various parts of the country to the city in search of livelihood. To sustain the city, it is obvious that these additional segments of society require transportation services to conduct their daily activities. However, the city is unable to meet the current high demand for transportation services. Additionally, inefficient land use planning, inadequate infrastructure, and a lack of well-managed traffic are major contributors to the problem of traffic congestion. As a result, it is self-evident that understanding the current state of vehicles is necessary. Traffic congestion is a critical area of consideration in order to make the best decision possible to resolve the issue and thus maintain a continuous flow of traffic that contributes to the city's economic growth (Agyemang, 2009).
Ghana, like the rest of Africa, has had mixed results with Rural Development and Structural Adjustment Programs aimed at resolving urban issues (Obeng-Odoom, 2007). Speaking (Kwakye & Fouracre, 1998, p. 1) at a conference in Cape Town, South Africa, the Director of Planning at Ghana's Ministry of Transport and Highways and his advisor stated: "Ghana's urban transport

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system is characterised by congested central areas, substandard service from public transport operators, a high risk of road accidents, and a lack of environmental stewardship." This is reflected in longer commute times and journey delays, lengthy wait times for transportation at and between terminals, a high rate of accidents, and localised poor air quality."

Urban transportation facilitates access to essential services and social activities (Arasan, 2012; Rodrigue et al., 2009; Lu et al., 2009). Businesses rely on urban transportation systems to keep their customers, employees, and suppliers mobile. Additionally, transportation is central to humanity's economic and social activities. It is a vital link in nearly every sector of an economy. Commerce within and between regions is critical for economic development and is directly related to transportation (Kulash, 1999; World Bank, 2002). Despite the importance of transportation, traffic congestion has been a major issue in the majority of metropolises. Several factors have been identified as contributing to this, including rural-urban migration, the displacement of residents from the central business district, inadequate road networks, an increase in the number of vehicles, poor signal timing, and road user attitudes (Ofori-Dwumfuo & Dankwah, 2011)
Congestion in Ghana's roadways is not a new occurrence. It imposes a cost on the economic productivity of cities' communities and economies. Despite lower car ownership rates, traffic congestion is becoming a more serious issue in the day-to-day activities of all people in all parts of Africa's cities, including Ghana, particularly during morning and evening peak hours. Primarily, traffic congestion is increasing as a result of rising car ownership, insufficient traffic management in cities, insufficient road capacity to handle existing traffic volumes, insufficient public transportation, fixed working hours, and poor land-use or transportation-land-use planning integration, as well as an illegal on-street parking habit.
Congestion has developed on the University of Cape Coast's campus as a result of the increase in the number of people driving and the implementation of a traffic management system. Congestion has increased travel times and delayed arrivals, affecting businesses, user productivity, and fuel consumption-wastage (Akyüz, 2015).

2. METHODOLOGY

The study used a quantitative and descriptive design of which convenience sampling was used to select 250 respondents (senior members, workers (TEWU), students (private car owners), taxi cab drivers, shuttle drivers as well as minibus drivers) in the University of Cape Coast. Questionnaire and structured interviews were the main data collection instruments and serve as primary sources of data. Ethical issues were considered to cater for the confidentiality, privacy, informed concern and free participation as well as anonymity of the respondents. Moreover, the data was analysed with the aid of Statistical Product for Service Solution (SPSS version 21.0) using percentages, frequencies and correlation. The analyses were presented by using tables and charts using Excel 2020 version. However, the responses from the interviews were transcribed verbatim and discussed thematically based on the objectives of the study.

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3. RESULTS AND DISCUSSIONS

Demographic Information on Respondents

This section presents information on the background characteristics of the respondents, that is, sex, age, marital status, religious affiliation, educational status, and occupational status. Out of the 250 respondents who participated in this study, 205 (82%) were males while 45 (18%) were females, majority of the respondents who partook in this study were found below 40 years. Married respondents were 215, 26 of the respondents had never married, and 9 had divorced. On education, tertiary education had the highest number of respondents of 214 (86%), followed by others such as no form of education and technical education (27, 11%) and secondary education (9, 3%). This means that majority of the respondents have had a higher form of formal education and were able to read and respond to the demands of the questions asked in the study. Occupation of respondents include public servants, students (educationists), civil servants, engineers and administrators, with few of the respondents being surveyors, auditors, business executives, taxi drivers and artisans. Almost all the respondents were working and have acquired cars for themselves.

Table 1: Category of car used by the respondents

Category of car	Frequency	Percentage
Private	196	78.4
Van	45	18
Taxi	9	3.6
Total	250	100

According to Table 1, the majority (196, 78%) of the respondents have private cars, followed by taxi (45, 18%) and the least (9, 4%) was van or minibuses. On the purpose of these categories, majority of the respondents used their cars for private or personal use while few of the respondents used it for commercial purposes.

Table 2: Causes of road traffic congestion

Factors	Disagree	Don't know	Agree
Too many taxis/buses/private cars	32	32	80
Inadequate space for parking lot	39	21	190
Poor traffic control management	91	48	112
Present of many speed rumps	150	14	86
Poor driving habit	97	36	117
Cars competing for space	81	25	144

Table 2 shows the possible factors responsible for road traffic congestion on campus. It shows that majority of the respondents identified inadequate space for parking lot as the major contributor to road traffic congestion on campus. It was followed by cars competing for space (144), poor driving

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habit (117), poor traffic control management (112) and an increase in car ownership (80). However, few of the respondents agreed that speed rumps was the main causes of road traffic congestion on campus.

This is confirmed by an extract from 35 years old taxi driver

"for the past five years, the number of cars on campus was small as compared to today. There is not enough space for these cars to park so you can even see the physical sciences' buses, campus churches' buses and private cars being parked on the road side."

Table 3: Categories of cars found on campus

	Frequency	**Percentage**
Private cars	95	38
Taxi	52	20.8
Van	18	7.2
Pickups	33	13.2
Shuttle	16	6.4
Minibuses	19	7.6
Three-wheel	10	4
Two-wheel	7	2.8
Total	250	100

According to Table 3, a significant proportion of the respondents identified private cars as the major type of car commonly found on campus. It was followed by taxis, pick-ups, minibuses and shuttle. However, few identified three-wheel and two-wheel as common type of cars found on campus.

Table 4: Categories of cars associated with road traffic congestion on campus

	Frequency	**Percentage**
Private cars	90	30.2
Taxi	74	24.8
Van	22	7.4
Pickups	25	8.4
Shuttle	45	15.1
Minibuses	34	11.4
Three-wheel	4	1.3
Two-wheel	4	1.3
Total	298	100

To identify the particular type of car associated with road traffic congestion on campus, respondents were asked to tick the type of car associated with road traffic congestion on campus, and the result is presented in Table 4. It shows that a higher number of the respondents identified

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private cars and taxis as the main category of cars that are associated with road traffic congestion. It was followed by shuttle and minibuses while few of the respondents identified three and two-wheel as type of cars associated with road traffic congestion. This means that private cars and taxis are associated with road traffic congestion on campus.

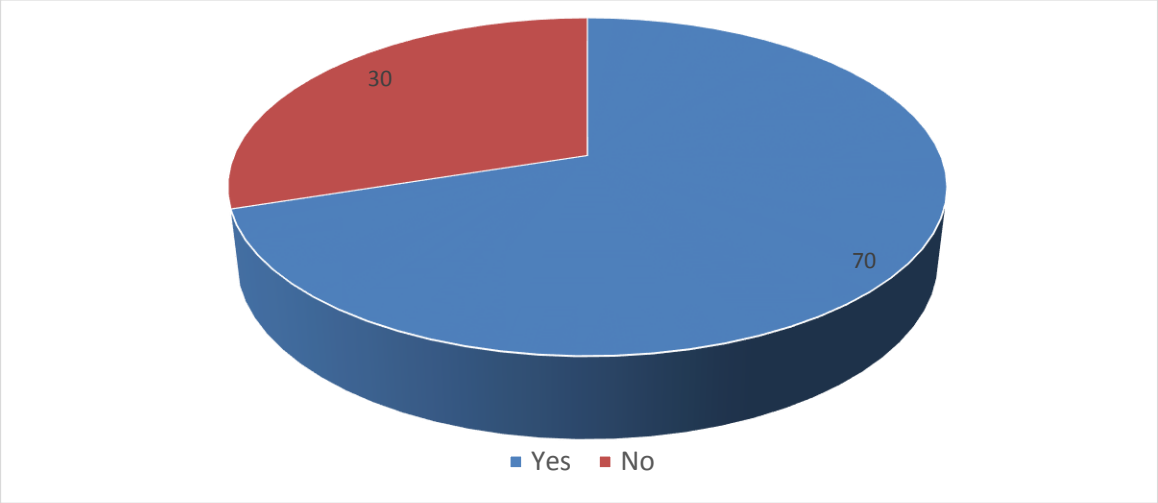

Figure 1: Effects of road traffic congestion on economic activities

Figure 1 shows whether there is any effect of traffic congestion on economic activities. It revealed that 70 percent of the respondents agreed that there was an effect of traffic congestion on economic activities. They further indicated that road traffic congestion may serve as a major threat to productivity since it influences communication.

Table 4: Effects of road traffic congestion on socio-economic factors

Factors	Disagree	Don't know	Agree
Waste of time	27	0	223
Dehydration and hunger	44	134	72
Stress	18	9	196
Pollution	26	27	197
Accidents	80	72	98
late for work/for lectures/delayed movement	45	36	169
Global warming	26	99	125
Low productivity	18	63	169
Inability to forecast travel time	35	81	134
Increased transport cost	53	81	116
Query at work	53	107	90
Relocation	52	108	90

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Increased in cost of fuel	62	56	134

With regards to the effects of road traffic congestion according to Table 4, waste of time was the major effect as indicated by 223 of the respondents, followed by air pollution (197), stress (196), late for work/lecturers and delayed in movement, global warming (169), increased in cost of fuel (134), low productivity (169), increased transport cost (116) and accidents (98). However, only a few of the respondents identified relocation, query at work and dehydration and hunger.

Table 5: Relationship between car ownership and traffic congestion

	Yes (%)	**No (%)**
Increased number of car ownership on campus	241 (96.4)	9 (3.6)
Increased traffic congestion over the years	188 (75.2)	62 (24.8)
Effects of car ownership on traffic congestion	161 (64.4)	89 (35.6)

$r = 0.337$ $p<0.001$

On the relationship between car ownership and traffic congestion, Table 5 shows that 241 (96.4%) of the respondents agreed that increased number of car ownership on campus causes traffic congestion. Also, increased traffic congestion over the years influence traffic congestion as it was agreed by 188 (75.2%). Moreover, 64% agreed that car ownership affect traffic congestion. This means that car ownership affects traffic congestion. Table 8 elaborates on the significant of the relationship between car ownership on traffic congestion on campus.
Moreover, Pearson correlation results ($r= 0.34$, $p<0.005$) shows that there is a weak positive relationship between car ownership and traffic congestion on campus. This was statistically significant. This means that when there is an increase in car ownership on campus, there is a corresponding increase in the road traffic congestion on campus, however, it is at a lower rate.

Table 6: Measures to curb road traffic congestion on campus

	Disagree	**Don't know**	**Agree**
Provision of enough parking space	18	44	188
Traffic education	36	54	160
Reduce the number of speed rumps	80	54	116
Rehabilitation all road needing attention	26	54	170
Enlarging the width of the road	71	45	134

According to Table 6, the majority of the respondents agreed to the notion that provision of enough parking spaces is an influential factor in curbing road traffic congestion on campus. Also, rehabilitation of all roads that needed attention is crucial when it comes to dealing with road traffic congestion as indicated by 170 respondents who agreed to this. Moreover, traffic education was another factor for curbing road traffic congestion as indicated by 160 respondents who agreed to this reason. To add up, enlargement of road width was raised by 134 respondents as a decisive

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factor for road traffic congestion on campus. Lastly, a small number of respondents identified reduction of speed rumps as a way of curbing the road traffic congestion on campus. This is confirmed by a 32 year old taxi driver that

"We need enough parking space on campus, and this traffic light there is even worrisome, and we do not know the reason why it is there."

4. DISCUSSIONS

On the type of cars used by the respondents, the majority (196, 78%) of the respondents have private cars, followed by taxi (45, 18%) and the least (9, 4%) was van or minibuses. On the purpose of these categories, majority of the respondents used their cars for private or personal use while few of the respondents used it for commercial purposes. A greater number of the respondents identified private cars as the major type of car commonly found on campus. It was followed by taxis, pick-ups, minibuses and shuttle. However, few identified three-wheel and two-wheel as common type of cars found on campus. on the other hand, factors responsible for road traffic congestion on campus are inadequate space for parking lot, cars competing for space, poor driving habit, poor traffic control management and increase in car ownership. This finding confirms that of Agyapong and Ojo (2018) who found that poor road network, narrow traffic lanes as well as poor discipline of road users accounted for traffic congestion in Accra.

With regards to the effects of road traffic congestion, waste of time was the major effect as indicated majority of the respondents, followed by air pollution, stress, late for work/lecturers and delayed in movement, global warming, increased in cost of fuel, low productivity, increased transport cost and accidents are the major ones. However, only a few of the respondents identified relocation, query at work and dehydration and hunger. It was revealed that 70 percent of the respondents agreed that there was the effect of traffic congestion on economic activities. They further indicated that road traffic congestion may serve as a major threat to productivity since it influences communication. Similarly, Weisbrod et al. (2003) indicated that higher transportation cost, wastage of working time and delay in service delivery, polluted air, unnecessarily long periods spent on roads, mental stress, tiredness/headache are among the effects of traffic congestion

On the relationship between car ownership and traffic congestion, 241 (96.4%) of the respondents agreed that increased number of car ownership on campus causes traffic congestion. Also, increased traffic congestion over the years influence traffic congestion as it was agreed by 188 (75.2%). Moreover, 64% agreed that car ownership affect traffic congestion. This means that car ownership affects traffic congestion. A higher number of the respondents identified private cars and taxis as the main category of cars that are associated with road traffic congestion. It was followed by shuttle and minibuses while few of the respondents identified three and two-wheel as type of cars associated with road traffic congestion. Similarly, Ruslan et al. (2020) found that private car ownership increases traffic congestion, air and noise pollutions, accidents, as well as unavailable parking lots. Conversely, Cullinane (2002) found that cheap public transport deters or reduces car ownership on campus among university students in Hong Kong.

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5. CONCLUSIONS AND RECOMMENDATIONS

Traffic congestion on the UCC campus is caused by inadequate space for parking lot, cars competing for space, poor driving habits, poor traffic control management and an increase in car ownership. The rising car ownership on campus influences road traffic congestion positively on campus. Road traffic congestion waste peoples' time, delays movements, increase global warming, increase expenses on fuel, low productivity and road accidents. Private cars and taxis are the type of cars used by the majority of the respondents. It was also found that the rise in car ownership, especially private cars, taxis, minibuses and shuttle buses were the major cause of road traffic congestion on campus. Therefore, it is recommended that the transport section of the University should provide enough spaces on campus for car parking. The transport section of the University should educate the car users (especially private and taxi drivers) on campus on the essence of traffic regulator and others.

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