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The Effect of Road Traffic on Supply Chain Performance of Kwasi Oppong Company Limited in Ghana

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Abstract: ***Nowadays companies have to deal with a business environment that puts more accents on the concept of customer-driven manufacturing. However, the order fulfillment process involves more than just filling orders. It is about designing a network and a process that permits a firm to meet customer requests while minimizing the total delivered cost. Hindrance to effective movement of goods and service in Kumasi to meet consumers need and order fulfillment at appropriate time by the logistics of supply chain management is road traffic congestion. In view of that the study sought to examine the effect of road traffic on supply chain performance of Kwasi Oppong Company Limited. Specifically, the study aimed at identifying the causes of road traffic, assess the effect of road traffic on supply chain performance, examine the effect of road traffic on customer service and assess the effect of road traffic on productivity. The study employed explanatory design of the quantitative approach. Employees of Kwasi Oppong Company Limited were target where 50 of them were selected using simple random sampling technique. Questionnaire was administered to the respondents and the data was analysed descriptively. The study found that road traffic is caused mainly by poor road network/narrowness of road, driving behaviour of drivers, concentration of economic activities in an area, encroachment of roads by residents and street vendors, unauthorized parking vehicles on the roads as well as breakdowns of vehicles on the road. Road traffic affect supply chain performance of Kwasi Oppong Company Limited by making its strategies for marketing strong, very competitive in the market, increase market share comparatively. However, it increased transportation cost, increase prices of goods and service though customer base is not affected. Road traffic increase the price of goods and services, road traffic affect customer satisfaction, cost of transportation is increased and customer complaints are addressed on time as well as customer base is increased despite the incidence of road traffic. Road traffic affect productivity of positively. It increased sales of organization, increase return on***

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investment and market share. Nevertheless, it increased operating costs of vehicles, costs of delays on raw materials. Therefore, it was recommended that Kwasi Oppong Company Limited should maintain or improves upon its strategic management in order to be highly competitive and increase in market share. Also, Kwasi Oppong Company Limited should adopt proper transportation planning and management in order to reduce transportation cost, cost of goods and services and operational cost. Moreover, Kwasi Oppong Company Limited should adopt different time aside peak and rush hours for delivery of goods and services in order to improve upon its service quality and customer satisfaction.

Keywords: Road Traffic, Supply Chain Performance, Kwasi Oppong Company Limited.

1. INTRODUCTION

Background to the Study

According to Leshem and Ritov (2007), the transportation system is a vital component of modern society, serving to facilitate efficient and cost-effective movement within a country and providing maximum mobility to all citizens. Transportation plays a central role in economic activities by enabling the transportation of raw materials, labor, inputs and outputs along supply chains, and connecting consumers to services and products (Andrew, Taner, Brian & Trevor, 2015). Road transport acts as a catalyst for urban, rural, and national development by facilitating movement, providing access to goods and services, and promoting social and economic interaction and employment opportunities.

The rapid population growth in African cities over the past few decades, driven by urbanization and rural exodus, has presented significant challenges in terms of infrastructure provision and coping with the increasing demand for transportation (International Association of Public Transport and African Association of Public Transport, 2010). However, the existing road infrastructure in African cities often fails to meet the actual transport demand, leading to congestion. Congestion, characterized by the presence of vehicles, pedestrians, and longer travel times, hinders the movement of people and goods in urban areas (Downs, 2004). It is widely acknowledged as a growing problem in many urban areas globally, including cities like Accra, Takoradi, and Kumasi. The increasing volume of vehicular traffic surpasses the capacity of the transportation system, resulting in traffic slowdowns that have detrimental effects on air quality, quality of life, and business activity (Ministry of Economic Planning and Budgeting, 2013).

Congestion poses a major obstacle to various activities dependent on transportation, whether public, governmental, or individual. The resulting losses have significant implications for social and economic performance. In Kumasi, congestion has been worsening, particularly impacting the economy of the state. This can be attributed to poor implementation of urban planning and outdated city policies. The adverse effects of congestion on local supply chains of manufacturing firms in Ghana have not been adequately studied in the transport and logistics literature (Boye, 2018). Despite recent efforts to improve transport infrastructure by both the federal and state governments, Kumasi's infrastructure remains inadequate to meet the demands of its booming economy. Predictions suggest that without major transport policy initiatives, congestion levels will rise by 40% above the 1990 level by 2007, 120% above it

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by 2017, and total traffic volume will increase by 28% by 2011 and 60% by 2031 (Alan, 1998).

In the economic context, as traffic volumes and congestion increase on highways and urban roads, maintaining dependable and reliable schedules becomes increasingly challenging for freight and delivery service operators. This directly affects supply chains and businesses reliant on trucking, which are of growing importance in both public policy and the private sector. Congestion has day-to-day cost implications, impacting supply chain management, as well as the long-term need to assess opportunities, risks, and returns associated with location, production, and distribution decisions. It is essential to consider both perspectives when evaluating the full range of impacts that traffic congestion can have on the economy (Glen & Stephen, 2011).

The overall growth of traffic congestion contributes to increased transport costs for delivered products, prompting firms to adjust their location and shipment configurations to optimize net revenues. According to Meller (2015), supply chain management encompasses a wide range of activities involved in planning, controlling, and executing the flow of products from acquiring raw materials through production and distribution to the final customer in the most efficient and cost-effective manner. This includes demand planning, sourcing, production, inventory management, storage, and logistics. While there is also a separate line of research on bottlenecks at firms, the impacts of congestion can span different supply chain configurations –including not only the movement of material and parts to producers and then to distributors, but also local distribution and delivery of finished goods to retail markets, and even local delivery of parts and repair services to businesses and households. Since the movement of goods is done by supply chain management of the firms, it is reasonable premises that supply chain management command the profit of the firms. This implies that supply chain management is the heart of the manufacturing firms while logistics remains the flowing blood. Therefore, supply chain management is the groundwork that supports every manufacturing firm.

Problem Statement

Nowadays companies have to deal with a business environment that puts more accents on the concept of customer-driven manufacturing. This creates an environment where there is more emphasis on differentiated product features, tight delivery performances and low costs (Hicks, Earl, Mc Govern, 2000). As of the customer-driven emphasis it is important for the manufacturing firm to consistently produce high quality products with competitive unit costs and high service levels (i.e. on time deliveries) (Ebadian, Rabbani, Torabi & Jolai, 2009). Revelle (2001) confirms this by stating that the three major features of the make-to-order (MTO) process are quality, cost and delivery. Delivery time is the fundamental order-winning criterion. Supply chain management has received substantial attention from both researchers and practitioners, yet in many companies' management is struggling to implement supply chain processes within their firms as well as across the supply chain. Order fulfillment is a key process in managing the supply chain. It is the customers' orders that put the supply chain in motion, and filling them efficiently and effectively is the first step in providing customer service.

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However, the order fulfillment process involves more than just filling orders. It is about designing a network and a process that permits a firm to meet customer requests while minimizing the total delivered cost (Keely, 2003). Hindrance to effective movement of goods and service in Kumasi to meet consumers need and order fulfillment at appropriate time by the logistics of supply chain management is road traffic congestion, which the World Bank (1999) stated that it constitutes about 54.5% of all noticeable urban transport externalities. Road traffic affect businesses in various ways including; productivity, customer service satisfaction and delivery, securing of raw materials timely among others. Despite this, a study has not been done or conducted about it in Kumasi businesses, therefore, this study seeks to fill this gap. This study will observe the trend of traffic growth with a view to examine its effects on delivery of goods and services along supply chain performance of the Kwasi Oppong Company Limited.

Research Objectives

The main purpose of the study is to examine the effect of road traffic delay on supply chain performance of Kwasi Oppong Company Limited. Specifically, the study seeks to:

1. Identify the causes of road traffic.
2. Assess the effect of road traffic on supply chain performance
3. Examine the effect of road traffic on customer service
4. Assess the effect of road traffic on productivity

2. RESEARCH METHODS

The study utilized a quantitative research approach to collect data and establish relationships between variables. The research design chosen was an explanatory design, allowing for examination of cause-and-effect relationships. The population of the study consisted of 65 workers from Kwasi Oppong Company Limited, including 5 management members and 60 employees. A simple random sampling technique was used to select a sample size of 50 employees. Validity and reliability of the data collection instrument were ensured through expert assessment and the use of Cronbach Alpha Coefficient. Ethical considerations were taken into account, including acknowledgement of sources, confidentiality of experts, and protection of respondent anonymity. Data was collected using a questionnaire administered to the selected employees, with a close-ended format and pre-testing for validation. Data processing involved cross-checking, editing, and entry into SPSS software, with descriptive statistics used for analysis and presentation.

3. RESULTS AND DISCUSSIONS

Introduction

This section presents on the results and discussion of the data gathered from the respondents on the effect of road traffic on supply chain performance of Kwasi Oppong Company Limited. Firstly, the background characteristics of the respondents were described. Secondly, the data gathered were analysed and presented based on the research specific objectives (identify the causes of road traffic; assess the effect of road traffic on supply chain

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performance; examine the effect of road traffic on customer service; and assess the effect of road traffic on productivity; recommend ways of reducing the effect of road traffic on supply chain performance.

Descriptive Statistics of Background Characteristics of the Respondents

This section presents the profile of the respondents used in this study. On sex, males were 47 and females were 3. This shows that most of the respondents were males while few were females. On age, most of the respondents were found within the ages of 31-45 years, followed by 10 respondents who were within 18-30 years while few (4, 8%) were beyond 46 years. These means that most of the respondents were more than 20 years and were found within the active population. Looking at the educational status of the respondents, Table 1 reveals that a larger number of respondents (23, 46%) have had secondary form of education, followed by 15 respondents who had their HND education. However, 7 respondents have no form of formal education while few (3, 6%) of the respondents have degree education. It can be deduced that majority of the respondents were highly educated and could respond to the demands of the questionnaire. On marital status, majority of the respondents were married while 8 of the respondents were single while 4 were co-habiting and 2 divorced. On years of working in the organization, a little more than half of the respondents (52%) have worked in the organization within 7-10 years, followed by 10 respondents who have either operated within 4-6 years or more than 10 years. Though, respondents have operated less than 10 years, majority of the respondents have also worked for more than 7 years and therefore, understood the processes and issues concerning road traffic and supply chain performance of Kwasi Oppong Company Limited.

Causes of road Traffic

Objective one sought to examine the causes of road traffic and data were gathered on a 5-point-likert scale and the results are presented in Table 1. Table 1 shows that the respondents strongly agreed that poor weather and visibility caused road traffic (M=4.66, SD=0.315), poor road network/narrowness of road (M=4.61, SD=0.315), driving behaviour of drivers (M=4.50, SD=0.552) and concentration of economic activities in an area (M=4.37, SD=0.334). Also, respondents agreed that encroachment of roads by residents and street vendors (M=4.66, SD=0.315), unauthorized parking vehicles on the roads (M=3.80, SD=0.893), and breakdowns of vehicles on the road are the causes of road traffic (M=3.40, SD=0.765). However, respondents were indecisive on whether processions of different kinds of religious, social or political activities cause road traffic or not (M=3.00, SD=0.342).

Table 1: Causes of Road Traffic

	Means	Std Dev.
Poor weather and visibility	4.66	0.315
Driving behaviour of drivers	4.50	0.552
Concentration of economic activities in an area	4.37	0.334
Poor road network/narrowness of road	4.61	0.432
Breakdowns of vehicles on the road	3.40	0.765
Unauthorized parking of vehicles on the roads	3.80	0.893

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Processions of different kinds including religious, social, political etc.	3.00	0.342
Encroachment of roads by residents and street vendors	3.97	0.775

Effect of road traffic on supply chain performance

Objective two sought to examine how road traffic affect supply chain performance of Kwasi Oppong Company Limited. Data were gathered from the respondents and the result is presented in Table 2.

Table 2: Effect of road traffic on supply chain performance

	Means	Std Dev.
Our market share is very high relative to our major competitors	4.04	0.867
Our organisation is very competitive in the market.	4.30	0.980
The strategic position of our organisation in the market is very strong.	4.57	0.883
Our organizational output has increased	4.61	0.424

Table 2 shows that the respondents strongly agreed that organizational output has increased (M=4.61, SD=0.424), strategic position of our organisation in the market is very strong (M=4.57, SD=0.883) and organisation is very competitive in the market (M=4.30, SD=0.980). In addition, respondents agreed that market share is very high relative to their major competitors. Despite road traffic, Kwasi Oppong Company Limited is able to compete with its competitors in business, had a strategic position and increased its output.

Effect of road traffic on customer service

Objective three focused on how road traffic affect customer service of Kwasi Oppong Company Limited. Data were gathered on 5-point likert scale and the results is presented in Table 3.

Table 3: Effect of road traffic on customer service

	Means	Std Dev.
Cost of transportation is increased	4.66	0.532
Goods and services are delivered to customers on time	4.50	0.671
Quality of services is assured	4.37	0.773
Customer complaints are addressed on time	4.61	0.821
Customer base is increased	4.10	0.431
Road traffic affect customer satisfaction	4.68	0.545
Road traffic increase the price of goods and services	4.82	0.612

Table 3 shows that the respondents strongly agreed that road traffic increase the price of goods and services (M=4.82, SD=0.612), road traffic affect customer satisfaction (M=4.68, SD=0.545), cost of transportation is increased (M=4.66, SD=0.532) and customer complaints are addressed on time (M=4.61, SD=0.821)**.** This shows that road traffic affect customer

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service by increasing prices of goods and services, affecting customer satisfaction as well as increasing transportation cost. However, customer complaints are addressed on time.
In addition, respondents agreed that customer base is increased despite the incidence of road traffic (M=4.03, SD=0.431). This may be due high demand for building materials that caused customers to buy from the organization despite the delay in service delivery.

Effect of road traffic on productivity
Objective four considered the effect of road traffic on productivity of Kwasi Oppong Company Limited.

Table 4: Effect of road traffic on productivity

	Means	Std Dev.
Compared to major competitors, sales of our organisation have been increasing rapidly	4.66	0.635
The operations of our organisation are very profitable relative to our major competitors	4.50	0.644
Our return on investment (ROI) is higher than that of our major competition.	4.37	0.132
Our market share is very high relative to our major competitors	4.31	0.591
Relative to our major competitors, our organisation is very competitive in the market.	3.40	0.651
Our organizational output has increased	4.77	0.911
Cost of productivity is reduced	3.00	0.711
Raw materials are secured on time	4.54	0.914
Growing operating costs of vehicles (mainly fuel)	4.61	0.822
costs of delays		

From Table 4, it can be observed that the greatest effect of road traffic on productivity can be seen as organization output has increased, sales of organisation have been increasing rapidly, growing operating costs of vehicles, costs of delays raw materials secured on time as well as the operations of our organisation are very profitable relative to our major competitors. These are observed from the table with the following mean and standard deviations respectively: 4.17, 0.911; 4.66, 0.635; 4.61, 0.822; 4.55, 0.914 and 4.50, 0.644. it can also be observed from the table that Our return on investment (ROI) and market share were affected by road traffic with mean and standard deviation: 4.37, 0.132 and 4.31, 0.591 respectively.

Table 5: Effect of Road traffic on Customer service

Model	Std Coeff.	t-statistic	Sign
(Constant)		12.022	0.012
Road Traffic	-0.312	-2.189	0.001

Table 5 describe the relationship between road traffic and customer service, however, whether the relationship was statistically significant or not, it could not tell. Therefore, Table 6 depicts the relationship between road traffic and customer service. Table 6 shows that there

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was weak negative effect (β= -0.411, p<0.05) of road traffic on customer service. This relationship was statistically significant. Thus, there would be delay in service delivery to customers, cost of transportation will increase, customer complaints will not be addressed timely, road traffic will increase price of goods and services which in the long run affect customer satisfaction.

Table 6: Effect of Road traffic on supply chain performance

Model	Std Coeff.	t-statistic	Sign
(Constant)		4.201	0.011
Road Traffic	-0.29	5.210	0.023

On the causal relationship, the standardize coefficient (β= -0.29, p<0.05) shows that there was a negative effect of road traffic on customer service. This effect was statistically significant.
Due to road traffic, organizational output is not expected to increased as expected, strategic position of our organisation in the market will not be very strong and organisation will not be very competitive in the market. Despite road traffic, Kwasi Oppong Company Limited is able to compete with its competitors in business, had a strategic position and increased its output (Table 6).

Table 7: Effect of Road traffic on productivity

Model	Std Coeff.	t-statistic	Sign
(Constant)		8.112	0.029
Road Traffic	-0.491	-6.210	0.033

To examine whether there was significant effect of road traffic on productivity, linear regression was used to test it and the result is presented in Table 7. The Standard Coefficient of the result shows that there was a negative effect (β= -0.491, p<0.05) of road traffic on productivity. Thus, raw materials cannot be secured on time due to road traffic, cost of productivity will increase, competiting with other companies becomes difficult due to road traffic.

4. CONCLUSIONS

Road traffic is caused mainly by poor road network/narrowness of road, driving behaviour of drivers, concentration of economic activities in an area, encroachment of roads by residents and street vendors, unauthorized parking vehicles on the roads as well as breakdowns of vehicles on the road.
Road traffic affect supply chain performance of Kwasi Oppong Company Limited by making its strategies for marketing strong, very competitive in the market, increase market share comparatively. However, it increased transportation cost, increase prices of goods and service though customer base is not affected.

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Road traffic increase the price of goods and services, road traffic affect customer satisfaction, cost of transportation is increased and customer complaints are addressed on time as well as customer base is increased despite the incidence of road traffic.
Road traffic affect productivity of negatively. It increased sales of organization, increase return on investment and market share. Nevertheless, it increased operating costs of vehicles, costs of delays on raw materials.

Recommendations
Based on the findings and conclusion of the study, the following suggestions are put forward for consideration:

- Kwasi Oppong Company Limited should maintain or improves upon its strategic management in order to be highly competitive and increase in market share.
- Kwasi Oppong Company Limited should adopt proper transportation planning and management in order to reduce transportation cost, cost of goods and services and operational cost.
- Kwasi Oppong Company Limited should adopt different time aside peak and rush hours for delivery of goods and services in order to improve upon its service quality and customer satisfaction.
- Kwasi Oppong Company Limited should also consider in siting its company or branches in less concentration of economic activities area in order to reduce the road traffic.

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