



Covid-19 and its effect on the transport industry in Ghana

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Abstract

The study poised to understand the impact of new pandemic on the transportation and logistics sector in Ghana. Data was gathered from 250 participants made of transport owners, drivers, mates and GPRTU personnel in Greater Accra and Central Regions of Ghana. The results from table 3 show that COVID-19 had negative effects on air, road and rail transportation in Ghana during the peak of pandemic. The responses however show that COVID-19 had a positive effect on the water/sea/ocean transportation. It was concluded that COVID-19 has greater impact on logistics and transport sectors in Ghana just any other country across the globe.

Keywords: pandemic, covid-19, air, road, rail, ocean

Introduction

According to Loske (2020), epidemic and pandemic outbreaks such as COVID-19, as well as other types of epidemics and pandemics, frequently precede a devastating impact on society, particularly in the domain of economic activities. To combat the spread of the COVID-19, which is highly contagious, governments in developing countries were able to impose a number of restrictions, including restrictions on people moving within the country unless it was absolutely necessary, physical interactions and closeness rules, the mandatory use of face masks in public facilities, and the temporary closure of businesses and service firms. These restrictions have had a significant influence on every sector of the economy, particularly logistics and transportation (Loske, 2020). The transportation business is in an unusual situation; one of its primary functions is to bring the world together, allowing citizens to contact face to face, and it is often regarded as the primary facilitator of social interaction. Because of the global mobility limits, that function has now been halted. The main goal of logistics and transportation companies is to move, store, and move items efficiently using the right routes (Umar, Ji *et al.*, 2021). In addition, Singh *et al.* (2021) point out that transportation businesses engaged in several modes of transportation and logistics, such as freight forwarding, warehousing, inventory management, and other multi-model transportation, in order to reduce the likelihood of potential economic risks. Similarly, global manufacturers have made use of their routes and techniques of transportation, which can be regarded an important part of delivering goods and services to customers (Haque *et al.*, 2020). Based on the several distinct roles and operations conducted by enterprises for trade, there is a strong relationship between logistics and the economy, which eventually increases the economic returns (Queiroz *et al.*, 2020). During the confinement, many transportation operations, such as the shipment of car components, clothing, flowers, and construction supplies, came to a halt. Professionals such as truck drivers, customs agents, and border inspectors were regularly held at border clearance posts for days at a time, potentially exposed to COVID-19 infection because to the often fragile infrastructure and sanitary situation at numerous land border crossings across the region (United Nations, 2021) [21]. The COVID-19 epidemic has left its mark on almost every industry on the planet (Umar *et al.*, 2020). Obviously, this has a significant influence on the transportation and logistics industry. Keeping these complexities and scenarios in mind, the goal of this study is to determine the impact of the COVID-19 pandemic on Ghana's logistics and transportation industry. A concerted effort has been undertaken to solve the specific concerns that have arisen as a result of the lockdowns. Furthermore, the researchers have underlined the substantial influence that the present lockdown scenario has had on countries whose trade and transportation have been severely and adversely hampered as a result of the pandemic.

This paper presents the good experiences and best practices of countries across Ghana as they respond to the transportation challenges posed by this pandemic that knows no political or economic boundaries—not just to get back to normal, but to keep pushing for transportation systems that serve the public, serve economies, and respect environmental and social goals. Hence the purpose was to investigate the effect of COVID-19 on all the four major transportation systems (air, rail, road and ocean) in Ghana.

Objectives of the Study

1. To find out the effect of COVID-19 on road transport in Ghana
2. To find out the effect of COVID-19 on rail transport in Ghana
3. To investigate the effect of COVID-19 on air transport in Ghana
4. To examine the effect of COVID-19 on ocean transport in Ghana

Research Questions

1. What are the effect of COVID-19 on road transport in Ghana
2. What are the effect of COVID-19 on rail transport in Ghana
3. What are the effect of COVID-19 on air transport in Ghana
4. What are the effect of COVID-19 on ocean transport in Ghana

Literature

COVID-19

The discovery of a novel coronavirus causing a pneumonia-like illness in early 2020 marked the beginning of the COVID-19 pandemic (WHO 2021) ^[22]. In December 2019, patients in Wuhan, China, were first diagnosed with COVID-19, a novel coronavirus (Zhu *et al.*, 2020) and the World Health Organization (WHO) announced it as a worldwide pandemic at the beginning of March 2020 and urged countries and public health authorities to respond and limit the number of new cases and deaths predicted (WHO, 2020; Arellana *et al.*, 2020) ^[23, 1]. Current reports show a total of 216,156,223 cases worldwide, 4,497,615 death cases, and 193,140,618 recovery ones, as of August 28, 2022 (Epidemic-stats, 2021). The transportation sector, being both a driver and historic measure of economic activity, provides a natural backdrop to study some aspects of the pandemic. The stay-at-home orders and the pandemic more broadly have had significant economic consequences. With businesses temporarily—or permanently—closing their doors and employees losing work or becoming ill with COVID, national GDP plummeted. Since the entirety of the world's population is on "lockdown," road traffic numbers and movement behaviors on highways have declined (Clarke, 2020). According to study of different research, urban traffic has decreased everywhere in the world, but still not equally for all modes; public transport system has taken the biggest hit (Molloy *et al.*, 2020) ^[14]. A significant outcome of the COVID-19 prevention strategies was a decrease in traffic collisions on both urban and interurban highways, which resulted in a significant decline in traffic-related accidents and fatalities (Saladié *et al.*, 2020) ^[15].

Transport sector and the Pandemic

Reduced transport volume leads to a large reduction in traffic because epidemic and pandemic outbreaks cause severe interruptions in industrial activities or infrastructure. This reduction has an influence on the environment, and it is examined in particular in the context of COVID-19 and its varied government restrictions during lockdown periods (Dantas *et al.*, 2020; Le Quéré *et al.*, 2020; Sharma *et al.*, 2020) ^[7, 10, 16]. As a result of transportation limits imposed to battle the disease and the broader financial crisis, COVID-19 has had a significant impact on commercial road transport, especially traveler and goods. COVID19 has already compelled governments and agencies around the world to impose unprecedented transportation and mobility restrictions (Dantas *et al.*, 2020) ^[7]. Epidemic outbreaks, on the other hand, result in people contracting life-threatening illnesses, necessitating proper emergence control. Road and rail transportation, such as public transit and freight corridors, transmit the virus even further throughout cities and countries (Ballard, 2020) ^[2]. Vehicles, for example, have had varied results. While there has been some success in the rise of Vehicles Eats (Bellon & Rana 2020), the restriction of people movement across the globe (Connor 2020) ^[5], the closure of bars and restaurants (Bauer, 2020) ^[4], and the general fear of being in an enclosed car with a stranger who has been in contact with numerous other strangers (Statista 2020) ^[18] has resulted in a major weakening in ride-share company fortunes, with Vehicles reporting as much as a 70% decline (Bellon & Rana 2020) ^[4]. While it is expected that the company has experienced comparable losses in Ghana, and anecdotal data shows that some vehicle drivers have been forced to return their vehicles to lenders, companies like Bolt and Uber are showing signs of recovery with fewer travel limitations (Shaver, 2020) ^[17]. In contrast, demand for transportation and logistics has increased in some industries (digital marketing and e-commerce) (McLeod, 2020) ^[12], though not nearly enough to compensate for lower demand in other sectors. Many years of research will be required to fully comprehend the complicated relationships that these actions have on the transportation sector. The logistics and transportation industries are one of the most important industrial sectors in many nations, and the COVID-19 outbreak has brought a variety of obstacles to the industry around the world. Additional logistics and transportation expenses, diminishing passenger travel demand, and increased demand for technical advancements are just a few of the problems (Luman *et al.*, 2021) ^[11].

A Case in Ghana

In this article, the effects of the government's COVID-19 control measures on Ghana's public transit and road safety are discussed. During a lockout imposed to address the risk of coronavirus, the government halted all public transit operations. In addition, urban transport trucks are only allowed to operate at 50% of their full capacity. These methods will have a negative impact on the transport sector's finances, exacerbating the economic crisis that public transit and airline companies are experiencing in Ghana. The number of traffic incidents has continued to climb in comparison to the same timeframe in prior years, as more private automobiles are being driven due to a potential inability to use public transportation. During the lockdown, however, when travel restrictions were gradually removed, road accidents and the deaths and injuries that occurred continued. According to our findings, limiting mobility reduces road traffic fatalities and incidents by a small amount. The current issue must act as a motivator for both governments and citizens to engage in creative and positive efforts to ensure that all Ghanaians have access to safer roadways.

Conceptual framework

Air transport

The worldwide air transportation sector is contracting (ICAO, 2020), owing to limits on people mobility and the shutdown of numerous international boundaries (IATA, 2020). A shift in consumer spending habits and decreasing demand for most commodities, with the exception of necessities (Accenture 2020), has resulted in lower levels of movement for luxury items often transported by air (D'Arpizio *et al.*, 2020). On the contrary, rising demand for medications (IANS 2020) and computer and related equipment (Kan, 2020) suggests that the air freight business hasn't fully declined, despite supply chains struggling to keep up (Kan 2020). Although most interviewees believe that leisure demand would rebound sooner than business demand, they also believe that consumers will travel less as a result of the gradual economic recovery. Because leisure travelers have stronger price elasticity (Morlotti *et al.*, 2017) ^[13], it's possible that European leisure demand may migrate away from traditional "sunand-beach" locations in Southern Europe and toward more cheap destinations in northern Africa or the eastern Mediterranean. Similar consequences could be felt all across the world. Health issues were also thought to have a greater impact on leisure demand than on business demand. Business travel is normally required, although pleasure travel may necessitate health considerations if Covid-19 remains a problem in some locations (Zhuang *et al.*, 2020) ^[26]. Therefore, it is hypothesized that:

H1: COVID-19 had positive effect on air transport in Ghana

Rail Transport

The propagation of the virus in the form of fluids of an infected individual, which may fall on different surface aspects of the station, or via muscle touch with individuals infected with the virus, as well as changes in customer's tastes, have been discussed as short-term consequences on rail transportation. More than 97 percent of consumers chose walking or using personal transportation as a safer mode of transportation, according to Tan and Ma (2021). Changes in train design, as well as changes in the materials used in train manufacture, could help to prevent future viral outbreaks. Therefore, it is hypothesized that:

H2: COVID-19 had positive effect on rail transport in Ghana

Ocean/Water Transport

According to Ho *et al.* (2021) assessment, one of the most common transport networks is the ocean route, which companies in many nations can utilize to manage logistics operations. The COVID-19 epidemic has also led to a variety of changes in maritime freight around the world, which has impacted the countries' ability to transfer goods (Yazir *et al.*, 2020). Therefore, it is hypothesized that:

H3: COVID-19 had positive effect on ocean transport in Ghana

Road/Land Transport

The effects on trucks and logistics industries was rapid due to the first restriction on the sale of various items, the reduction in goods movements, and the resulting contraction of the retail sector (Stats SA 2020a) ^[19, 20] (Stats SA 2020d) ^[19, 20]. There has been a 679.9% drop in South Africa's transportation sector in the last three months, according to estimates ranging from a decrease in vehicle movements (Waterworth 2020) to driver layoffs (Mzobe 2020). (Stats SA 2020b) ^[19, 20]. Globally, according to Kim (2021), travel to large cities and the use of public transportation have decreased by 50-90 percent, and the transport industry in various countries has attempted to solve this issue by limiting car manufacturing in order to increase safety-related investments. The effects of COVID-19 on freight transit were examined by Ho *et al.* (2021), with a focus on China. China's road freight transportation turnover has been negatively affected by COVID-19 as the number of confirmed cases has increased, leading to emergency stockpiling and mismanagement of vital resources and facilities, unstable supply and demand, as well as changes in consumer purchasing patterns (such as increased fears), which have resulted in a decline in consumer spending. In 2020, (Yazir *et al.*, 2020), Therefore, it is hypothesized that:

H4: COVID-19 had positive effect on road transport in Ghana

Methodology

A questionnaire survey was conducted at ten stations of the various GPRTU in Greater Accra and parts of Central Regions including Tema, Nkrumah Circle, Kasoa, Agbogboloshi, Makonla and Madina to gather data. Only 250 of the 360 participants were able to provide meaningful data. They were adapted from past studies and author's instruments (Javid *et al.* 2013; Lai and Chen, 2011). Statistical Package for Social Services (SPSS) Amos version 22.0 was used to validate and test the hypotheses that had been produced using AMOS (Hair, Ringle & Sarstedt, 2017) ^[8].

There are two levels of data analysis: measurements and structural models. Convergent validity and discriminant analysis will be used in the measurement model to analyze the relationship between the latent variables. The structural model examines the model's inner workings, as well as the model's ability to forecast the future (Hair *et al.* 2017) ^[8].

Results

Validity and Reliability Testing

Reliability was tested using Cronbah alpha with a cut-off point of 0.70 and above (Hair *et al.*, 2017) ^[8]. As indicated in table 1, all the apha values were greater than 0.7, signifying that the instrument was internally consistent. Convergent validity was tested by using Composite Reliability (CR) and Average Variance Extracted (AVE). The threshold for AVE is that it should be greater than 0.50, whilst CR should be greater than 0.70 (Hair

et al., 2017) [8]. As indicated in table 2, CR values show the level at which the construct indicators have exceeded the recommended cut-off point of 0.70. In this case, the latent construct was able to explain for more variance in the indicators than the necessary 0.5 average variance (Hair *et al.*, 2017) [8]. Because of this, the variables and constructs are all measured at appropriate convergent validity levels. This study utilized the Fornell-Lacker criteria, which has been shown to be reliable for assessing statistical parameters (2015). All indicators in Table 1 have a value greater than 0.50 and below 0.90. Again, the square root of AVE in the diagonal were higher than the inter-correlation values which set up discriminant validity of the study as indicated in table 2. When it comes to the validity of the factors, factor loadings were used. Factor loadings must be at least 0.60 in order to be considered significant, according to a study by Hair and colleagues. Since this barrier has been crossed, the values above it are considered valid. Table 1 shows that none of the indicators need to be lowered because they are all above 0.6 in this regard.

Table 1: Reliability and validity

| | Items | Loadings | α | CR | AVE |
|-----------------|-------|----------|----------|------|------|
| Air transport | | | 0.98 | 0.78 | 0.69 |
| | AT1 | 0.78 | | | |
| | AT2 | 0.89 | | | |
| | AT3 | 0.73 | | | |
| Rail Transport | | | 0.79 | 0.89 | 0.71 |
| | RT1 | 0.72 | | | |
| | RT2 | 0.70 | | | |
| | RT3 | 0.71 | | | |
| | RT4 | 0.70 | | | |
| Ocean Transport | | | 0.90 | 0.93 | 0.60 |
| | OT1 | 0.77 | | | |
| | OT2 | 0.70 | | | |
| | OT3 | 0.73 | | | |
| Road Transport | | | 0.91 | 0.90 | 0.73 |
| | RDT1 | 0.70 | | | |
| | RDT2 | 0.72 | | | |
| | RDT3 | 0.73 | | | |
| | RDT4 | 0.78 | | | |
| | RDT5 | 0.71 | | | |
| | | 0.60 | | | |
| COVID-19 | | | 0.87 | 0.88 | 0.58 |
| | C1 | | | | |
| | C2 | 0.78 | | | |
| | C3 | 0.89 | | | |
| | C4 | 0.73 | | | |
| | C5 | 0.70 | | | |

Table 2: Discriminant Validity

| | AVE | 1 | 2 | 3 | 4 | 5 |
|-----------------|------|------|------|------|------|------|
| Air transport | 0.69 | 0.83 | | | | |
| Rail Transport | 0.71 | 0.41 | 0.84 | | | |
| Ocean Transport | 0.60 | 0.60 | 0.32 | 0.77 | | |
| Road Transport | 0.73 | 0.53 | 0.51 | 0.53 | 0.85 | |
| COVID-19 | 0.58 | 0.58 | 0.35 | 0.41 | 0.54 | 0.76 |

Hypotheses testing

It is clear from the hypothesis assessment summary whether or not the original hypothesis is accepted or not. The goal of hypothesis analysis is to determine whether or not the testing was significant and whether or not the study's goal was attained. The researcher wanted to know how COVID-19 will affect Ghana's logistics and transportation sector, therefore the looked at rail, air, road and ocean transportations.

Table 3: Hypotheses testing

| Hypothesis | Paths | Beta | t-value | p-value | Results |
|------------|----------------------------|-------|---------|---------|----------|
| H1 | COVID-19 → Air transport | -0.52 | 1.58 | 0.450 | Rejected |
| H2 | COVID-19 → Rail Transport | -0.63 | 0.85 | 0.621 | Rejected |
| H3 | COVID-19 → Ocean Transport | 0.54 | 4.70 | 0.010 | Accepted |
| H4 | COVID-19 → Road Transport | -0.46 | 1.51 | 0.127 | Rejected |

The study poised to understand the impact of new pandemic on the transportation and logistics sector in Ghana. The results from table 3 show that COVID-19 had negative effects on air, road and rail transportation in Ghana during the peak of pandemic. The responses however show that COVID-19 had a positive effect on the water/sea/ocean transportation. This is particularly so because very few travel by water to other countries and communities in Ghana. The analysis show that COVID-19 has negative but insignificant influence on Air transport ($\beta = -0.52$; $t = 1.58$ and 0.450), hence, hypothesis 1 was rejected. The analysis show that COVID-19 has negative but insignificant influence on Rail Transport, ($\beta = -0.63$; $t = 0.87$ and 0.621), therefore, hypothesis 2 was rejected. Table shows that COVID-19 has negative but insignificant influence on Road Transport, ($\beta = -0.46$; $t = 1.51$ and 0.127), therefore, hypothesis 3 was also rejected. Finally, the analysis show that COVID-19 has negative but insignificant influence on Ocean Transport ($\beta = 0.54$; $t = 4.70$ and 0.010), hence hypothesis 4 was accepted.

Discussions

The study poised to understand the impact of new pandemic on the transportation and logistics sector in Ghana. A new epidemic is expected to have a significant impact on Ghana's transportation and logistics sector. Table 3 shows that COVID-19 had a detrimental impact on Ghanaian transportation during the peak of the pandemic. Responses to COVID-19 reveal that the water, sea, and ocean movement was improved. This is especially true because very few Ghanaians travel outside of the country by water. Road and rails transportations were tested by Shaver (2020)^[17], where COVID-19 was found to have negative effect on rail and road transport. This study confirmed this assertion. Xu *et al.* (2021), the effect of COVID-19 on air, road and ocean transportations were assessed. In that study, ocean transport was positive, meaning that COVID-19 did not have positive effect on water transportation, hence, confirming the findings of this current study. But still in the same study, road and air were negative.

Conclusions

The study poised to understand the impact of COVID-19 on the transportation and logistics sector in Ghana. The study's focus was on the transport and logistics industry's response to the COVID-19 epidemic, which was examined utilizing a variety of academic sources. According to the findings, stringent import and export restrictions, decreased demand for passenger travel, and greater criteria for standard service quality have impacted multi - modal transport activities, resulting in greater expenses. In light of the recent COVID-19 epidemic, it is imperative to plan for future interruptions. Countries around the world have struggled to coordinate public transport and economic responses across numerous systems as a result of the COVID-19 epidemic. Efforts to limit the spread of the disease have had a substantial negative impact on both personal and commercial activity. Our transportation system has played a dual role in dealing with natural disasters: evacuating individuals and helping first responders to visit the afflicted areas. As a result of the present pandemic, critical services must continue to operate. Despite the fact that overall public transit use has fallen, vital employees still require it, therefore the organizations that provide it must be ready to provide it going forward. In order to provide greater physical separation for public transit and other shared-ride vehicle operators, safety measures should be strengthened and maybe altered. There is an obvious need for more study on connected and automated cars that will have long-term effects on our transportation system as a result of the freight and logistics systems' importance in maintaining lifelines such as food, water, communications and power during a pandemic. When faced with a disruptive event like COVID-19's breakout, it is critical to reassess the underlying design of social and economic resilience, especially for poorer and rural populations.

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