

THE IMPACT OF COVID-19 CONTAINER SHORTAGE ON THE GLOBAL SUPPLY CHAIN

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Abstract

It is estimated that more than 90% of global trade is carried by sea. As the COVID-19 outbreak in 2019 has impacted many aspects of nations' growth globally, it also affects the supply chain networks, and eventually, disruptions of the supply chain are encountered. This scarcity or shortage due to COVID-19 became a global issue with so many negative impacts for there is an imbalance of global trade between supply and demand and some restrictions by nations regarding regional quarantine practices. The shortage of the container in the region that were in need caused the manufacturing industries to have a slower performance in their production and locked the global supply chain which put the liner industry into a dilemmatic decision that they eventually decided to do some port omissions or even blank sailing to cutting down their operational cost. On a bigger picture, this shortage that resulted in sky-rocket ocean freight has caused inflation worldwide due to rising prices in commodities. This research shall be based on literature methodology as the areas shall be discussed in detail showing the findings.

Keywords: COVID-19, Container Shortage, Supply Chain, Disruptions & Shipping Lines.

1. Introduction

The continuous economic activities in trading help nations to enhance their GDP for it shall increases when there is a trade surplus. Yang et al (2011) stated that Maritime shipping represents the most ancient global transportation, holding a unique role in the geographical discovery, communication of cultures, and development of the economy throughout history. But, shipping is also a significant source of greenhouse gas emissions (GHG) that expert conclude around 3% of global GHG emissions annually were caused by the shipping industry. According to International Transport Forum (ITF) as the demand for global trade keeps on increasing, maritime trade volumes are expected to triple in 2050. They also predict that further growth of e-commerce would increase global freight volumes as freight regarding to Co2 emission would also increase – this issue has drawn Scientists' attention to the threats posed by global warming. In July 2011, IMO adopted mandatory measures to improve the energy efficiency of international shipping through resolution MEPC.203(62) representing the first ever mandatory global energy efficiency standard for an international industry sector including the shipping lines industry. This GHG strategy envisages, in particular, a reduction in carbon intensity of international shipping (to reduce CO2 emissions per transport work as an average across international shipping should be reduced by at least 50% by 2050. According to IMO, when considering the emissions per tonne of cargo carried, per kilometer traveled; studies have shown that ships are by far the most energy-efficient form of transportation, compared with other modes such as aviation, road trucks, and even railways.

In 2020, china was the number 2 economy in the world in terms of GDP (current US\$), the number 1 in total exports, the number 2 in total imports, the number 68 economy in terms of GDP per capita (current US\$) and the number 28 most complex economy according to the Economic Complexity Index (ECI). However, in said current year where China became the epicenter of Corona Virus and thus the pandemic has spread globally, the world went into a lockdown and affected economic growth due to factories were closed down and eventually resulted in the blockage of containers at ports, which pushed carriers to reduce the number of vessel sent out to the sea. The empty containers were not picked up and both export and import

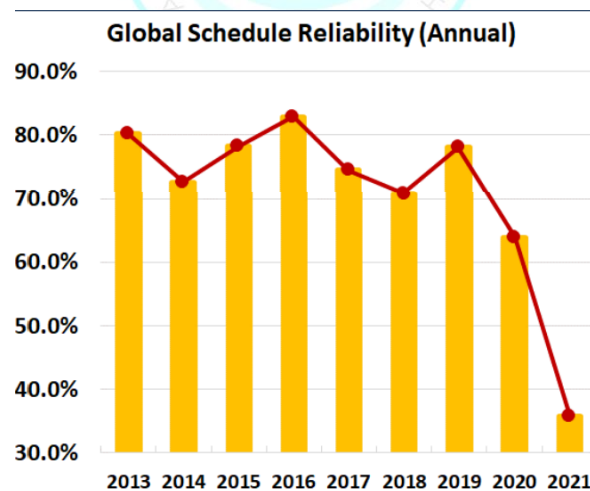
have been severely hampered. The reduction in the number of shipping vessels operating as a result of the pandemic eventually led to fewer empty containers being picked up and caused container scarcities.

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Dozens of vessels queuing at the world's largest maritime ports. A shortage of shipping containers. Dockworkers, warehousing operators, and truck drivers. Factory closures across Asia's manufacturing landscape – resulting in longer supplier delivery times. Higher fuel prices – higher ocean freight. Significantly more expensive transport and logistics services, eventually made their way into overall inflation and affected people's daily lives. Further – exacerbated by extreme weather events linked to climate change, lingering infrastructure and structural bottlenecks in major trade lanes and corridors, such as Suez Canal and recently, the Russia's invasion of Ukraine. Murphy (2021) stated that Shipping lines providing services to the regions in which quarantine decisions were made can add different ports of call to their shipping schedules by announcing "blank sailing" to ports within the region until the port congestion problem is eliminated. In 2021, shipping companies announced "blank sailing" for 919 container ships on transpacific and Asia Europe routes and decided to temporarily suspend the port calls of ships.

According to the research which is done by Sea Intelligence – schedule reliability dropped from 78% in 2019 to 63.9% in 2020, and then to 35.8% in 2021, and it is also being stated that said percentage is not only the lowest recorded but is also staggering drop from the pre-2020 levels.

Figure 1: Global Schedule Reliability

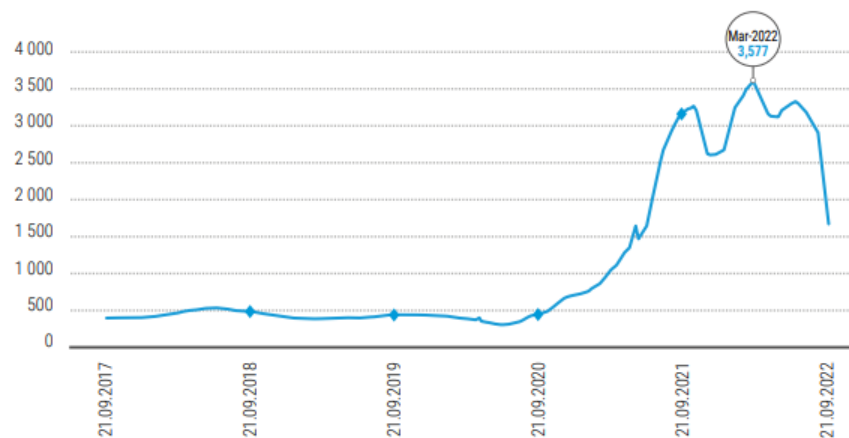


Source : Sea Intelligence

Business Issue

The shipping line industry experiences uncertain conditions globally due to a highly competitive environment and uncertain customer behavior. External data is gathered from substantial world-scale organizations such as UNCTAD and the World Bank to get more insight into the business issue to support and find the root cause of this research. The pandemic has led the world into chaos, it affected many aspects of human lives globally. International trades were disrupted due to restrictions in many countries pushed companies to freeze their business and it eventually led to less production being produced which affected the nation's gain and international market trade due to container scarcity globally – worse, due to the scarcity caused by container movement issue where there was abandoned or long stay cargo at port due to shortages of worker and this shortage of equipment eventually led to sky-rocket freight rates and it has reached historical highs and rates to South America and West Africa are now higher than to any other major trade region. The obstruction at the Suez Canal by a grounded container vessel also contributed to a recent further surge in freight rates (UNCTAD, 2021).

Figure 3 : New Container Index Index, September 2017-September 2022

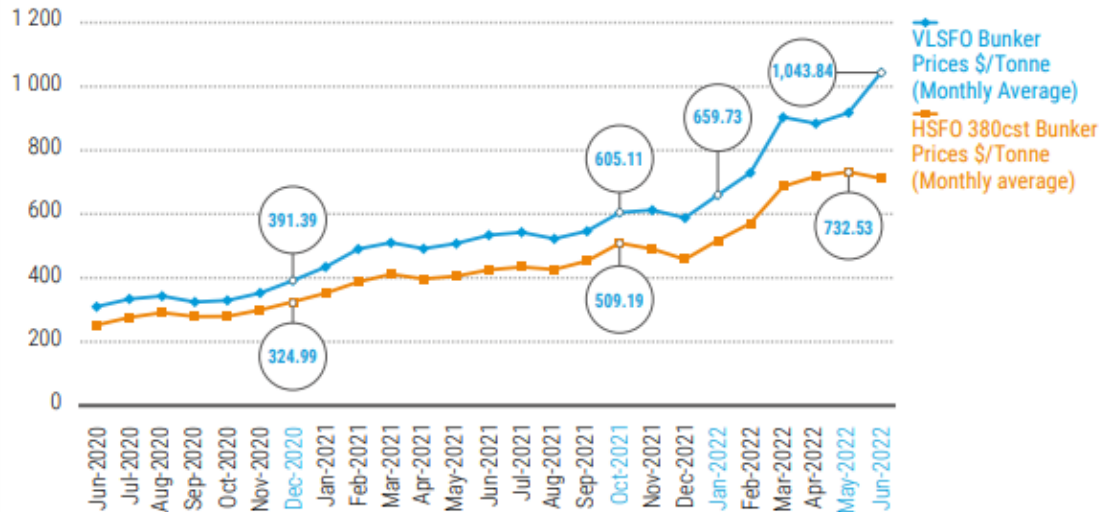


Source : UNCTAD Secretariat, based on data from the New Context Index for Container Ship Chartering produced by the Hamburg Shipbrokers Association.

Notes: The New ConTex is based on assessments of the current day charter rates of six selected container ship types which represent their size categories: Type 1,100TEUs and Type 1,700 TEUs with a charter period of one year and Index base : October 2007 – 1,000 points

Ever since the start of the pandemic outbreak, shipping lines have had suffered with logistic constraints and higher fuel prices, yet they have boosted their profits.

Figure 4: Bunker Prices, Heavy Fuel Oil and very low sulfur fuel oil, monthly averages, from June 2020 to June 2022



Source : UNCTAD, based on data provided by Vlarcksons Research Shipping Intelligence Network

Review of Literature

A supply chain consists of all parties involved, directly or indirectly, in fulfilling a customer request. The supply chain includes not only the manufacturer and supplier, but also transporters, warehouses, retailers, and even customers themselves. Successful supply chain management requires many decisions relating to the flow of information, products, and funds. Each decision should be made to raise the supply chain surplus. These decisions fall into three categories or phases, depending on the frequency of each decision and the time frame during which a decision phase has an impact. Supply chain decisions may be categorized as strategic (design), planning, or operational, depending on the time horizon over which they apply. Strategic decisions relate to supply chain configuration. These decisions have a long-term impact that lasts for several years. Strategic Decisions define the constraints for planning decisions, and planning decisions define the constraints for operational decisions. (Chopra, 2019)

A conservative estimate is that as much as 90% of global demand is not fully satisfied by local supply. Current demand coupled with a world population projected to increase by an average of over 200,000 persons per day for the next decade equates to substantial market opportunity. The range of product/service growth potential varies greatly between industrialized and emerging economies. The logistics of internationalization involve four significant differences in comparison to national or even regional operations. First, the distance of typical order-to-delivery operations is significantly longer in international as contrasted to domestic business. Second, to accommodate the laws and regulations of all governing bodies, the required documentation of business transactions is significantly more complex. Third, international logistics operations must be designed to deal with significant diversity in work practices and the local operating environment. Fourth, the accommodation of cultural variations in how consumers demand products and services is essential for successful logistical operations. (Closs, 2019)

With the globalization of the supply chain, sea transportation has become an essential component. Shipping lines are a capital-incentive industry with long investment lead times. Dynamic operations and uncertain activities associated with long geographical distances in container shipping have brought a challenge to the quality of their services. Increasing concerns about the social and environmental impacts of shipping also affect shipping operations and performance and with that being said, all those issues bring massive challenges

to the container shipping industry. (Song, 2016)

Ocean carriers and container ports are two main players in the global container supply chain. Ocean carriers have invested heavily in ship and containers asset in order to provide maritime transport services to the shippers and that is through some tight competition in the market.

Nevertheless, the competitive advantages this industry has been classified into two categories namely operational efficiency and the effectiveness of the service. This industry tends to emphasize cost reduction and asset (vessels and containers) utilization and efficiency. They have implemented a strategic alliance and deployed larger and more efficient ships for economies of scale and shared resources to enhance the utilization percentage.

2. Methodology

This research conduct purpose is to obtain the objective perspective of supply chain management and to get a bigger picture of understanding in global supply chain which focuses on water transportation

In research analysis of research methodology, the author does the analysis along with research with descriptive qualitative and illustrates the relationships that most describe the concepts. Further, it shall illustrate the relationship between the occurring situations with several theories related and interaction between them.

3. Data Collection and Data Analysis

Data collection was collected from the sources of their Annual Reports and several global institutions that is relevant and valid to the research purpose.

The data for this research was obtained from :

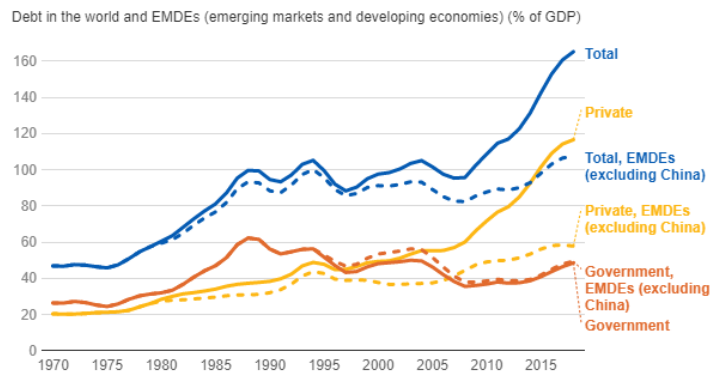
1. UNCTAD Maritime Reviews
2. World Bank
3. Other sources and references from mass media, research institutions, various literature and web sites on the internet that are related with the research problem would also be considered as references as research problem analysis.

After conducting data collection which has been collected before. The data analysis will be conducted which finding the problem of the supply chain in the company's shortage of containers.

4. Discussion and Findings

After the declaration of COVID-19 as a pandemic, a global-scale quarantine, and restrictive practices were applied globally this background also led to disruption in the global scale supply chain network and many countries suffers foreign exchange and labor shortages and sharp decreases in consumer demand. (Konyucu, 2021) Further, the debt has risen rapidly in a global scale. In Summary, the COVID-19 has taken the economic got into a worst condition.

Debt has risen rapidly in the world and in EMDEs



Averages computed with current U.S. dollar GDP as weight and shown as a 3-year moving average

Source: World Bank

The emergence of COVID-19 in China, which is recognized as the epicenter of export in the world during the period of the highest export volumes resulted in a rapid decline of commercial activity in the country and a much more intensive container shortage problem in the past. (Konyucu, 2021)

In a study conducted by Narasimha (2021) it is stated that in container transportation operations, uncertainty in demand can be experienced periodically. The rapid decline in global trade volumes caused by COVID-19 also triggered significant times losses in port operations. This is because the variation in international trade volumes is one of the most important variables that directly affect the efficiency of the container port.

		2020				2021		
		Q1	Q2	Q3	Q4	Q1	Q2	Q3
Developed	Export	-5%	-24%	-8%	3%	6%	13%	10%
	Import	-7%	-21%	-4%	5%	6%	15%	14%
Developing	Export	-14%	-18%	-1%	8%	8%	20%	26%
	Import	-11%	-21%	-7%	6%	7%	18%	21%

Source: UNCTAD secretariat calculations based on national statistics. Changes are seasonally adjusted and relative to pre-pandemic levels (2019). Q3 2021 statistics are preliminary. Statistics are for merchandise trade and do not include data on services.

As per the above information where shipping lines were implementing lots of blank sailing, things that should be taken into consideration is that More than 80% of international trade is carried out by maritime transport a global trade figure that suggests a problem in maritime transport will also have an impact on global trade. Indeed, in a study by Verschuur et al. (2021) conducted using ship monitoring data, it was concluded that volume losses of between 206 and 286 million tons in global maritime trade occurred in the first eight months of 2020. When shipping companies do not get sufficient bookings from ports in their regions of operation due to decreased trade volumes they reduce their port calls or declare blank sailing until the demand in the region reaches desired levels. In the second quarter of 2020, there was a 17% decrease in the number of ports of call (UNCTAD, 2021)

The container crisis is also a reflection of a slowdown in and delays across maritime supply chains a strain caused by the COVID-19 such as port labor shortages, port congestions (due to blank sailing), and capacity constraints in trucks and other inland transport systems. Those factors mean that the container dwell times increased and empty containers could not return to the system in which they were needed. (UNCTAD, 2020a).

Based on the literature discussion from UNCTAD (2021) gave indicates that after COVID-19 countries take some regulations to protect their citizens. Lockdowns and movement restrictions affect the supply chain networks. And Shipping lines suffered from low demand levels which means that vessels were sailing without loaded containers and ports calls were canceled. And eventually caused a global supply chain disruption and with this, the capacity regarding the imbalance would become more challenging for container lines.

Eventually, ocean freight increased for worldwide trade-lane, which eventually impact global economics. Shipping lines cooperate mainly to reduce their cost by enhancing the utilization of facilities, improving the service frequency and region of coverage by expanding capacity, rationalizing the shipping service network, and sharing the management resources. High-performance supply chain and logistics systems must be adaptive to changes in consumer requirements and technology. While these disruptors evolve over time, it is important to identify the current disruptors and how they will drive supply chain and logistics changes. (Closs, 2019)

The research done by Notteboom (2004) has provided an overview of the challenges facing port and ocean carriers in the competitive environment and through said research he analyzed the different paths that shipping lines might take including trade agreements, operating agreements (vessel sharing/slot charter. Consortia and alliances) and mergers and acquisitions. Song et al (2016) provide an overview of the uniqueness of shipping alliances compared to other transport industry sectors and thus play a central role in the operations and long-term viability of shipping lines. With the announcement of the 2M Alliances (Maersk & MSC) and the Ocean Three Alliances (CMA CGM, CSCL, UASC) in 2014, every shipping line in the top 10 in the world is a member of one of the global alliances.

The operating challenges of the global logistics system vary significantly in each major global region. North American logistics challenge is one of open geography with extensive and flexible transportation options and limited need for cross-border documentation. The European logistician, in contrast, is confronted by a relatively compact geography involving numerous political, cultural, regulatory, and language situations. The European infrastructure is also quite congested because of the population density and the fact that many of the roads date back centuries. The Pacific logistical challenge includes an island-based environment with relatively poor infrastructure, requiring extensive water and air shipments to transcend vast distances. These different characteristics require that firms having global operations develop and maintain a wide variety of capabilities and expertise. (UNCTAD, 2021)

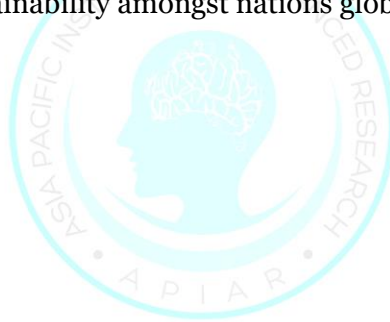
In container transportation operations, uncertainty in demand can be experienced periodically. Maritime companies (shipping lines) have developed several operational and strategic practices to deal with these situations when they occur including omitting some ports in the itineraries or the blank sailing of all ports in the itineraries and assigning ships to schedules on different routes. (Konyucu, 2021) Seven of the world's 10 largest container ports are located in China, and more than 50% of the global container shipping volume is handled at Chinese ports, the main reason being that China is not only the world's largest exporter but also the world's second-largest importing country. This global structure governing exports and imports necessitates the formation of a China-oriented container positioning cycle in container transportation.

After a full container is discharged according to this positioning cycle, the container needs to be quickly positioned in China, regardless of whether it is empty or full, and then shipped to different regions once it is full. This cycle plan increases the number of containers exported from China and leads to an insufficient number of imported containers. In addition, trade volumes of containerized cargoes increase rapidly with the increase in China-based trade activity that typically occurs before the New Year (Murphy, 2021). To enhance a firm's global capabilities, logistics management must consider five major differences between domestic and international operations such as performance cycle structure, transportation, operational consideration, information system integration, and alliances. [Closs, 2019]

Conclusion

COVID-19 has put the world into chaos in every aspect. The disruption of supply chains has affecting many of corporations and eventually causes most aspects of human daily lives for there are setbacks in economy scales. However, as this pandemic was unpreventable to spread across the globe, said conditions were marked as force majeure, hence, on the other side, this event is leaving some of research opportunities for companies, academics and experts to study further regarding to the new establishment of resilient supply chain networks.

As there are some limitations of this research study, the writer encourages all academicians, experts, and regulators to further study, so any further research and development may be a preventive step if this event may occur in the future as well as consider that there will always be connections in businesses' sustainability amongst nations globally.



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