İSTANBUL UNIVERSITY PRESS

Journal of Transportation and Logistics
JTL 2023, 8 (1), 29–35
DOI: 10.26650/JTL.2023.1178903

RESEARCH ARTICLE

Evaluating Trigger Effects of Covid-19 on Supply Chain Integration

Gülden Oral[1], Mahmut Mollaoğlu[1], Umur Bucak[2]

[1](Res. Assist.), Zonguldak Bülent Ecevit University, Maritime Faculty, Zonguldak, Turkiye
[2](Asst. Prof.), Kocaeli University, Maritime Faculty, Kocaeli, Turkiye

ABSTRACT
The Covid-19 pandemic affected almost all sectors of the economy. The maritime industry was also affected by the pandemic in various ways. During the pandemic period, the maritime industry experienced such challenges as empty container shortages, port congestion, labor shortages, etc. Different sectors of the maritime industry developed resilient strategies against these challenges. Liner shipping companies also developed horizontal integration strategies along supply chains to control and manage the whole process of door-to-door transportation. In this study, factors that accelerated the supply chain integration strategies of liner shipping companies during the Covid-19 pandemic period were investigated. In this context, the relevant literature was investigated in the SCOPUS database, and 24 articles were examined in a detailed manner. As a result of the literature review, the factors that accelerated the supply chain integration of liner shipping companies were coded through the MAXQDA 20 qualitative data analysis program, and the relationship between these factors was determined.

Keywords: *Liner Shipping, Covid-19, maritime industry, MAXQDA 20*

1. Introduction

Throughout history, societies and businesses have struggled several times with extraordinary epidemics that have had long-term effects on lives. 20 to 50 million people lost their lives due to the Spanish Flu epidemic between 1918-1919, and similarly, the Ebola virus had unique effects in all its dimensions. Major epidemics such as SARS, MERS, AIDS, cholera, and malaria affected the economy as well as society (Farooq et al. 2021). Covid-19 was discovered during a recent pneumonia outbreak in Wuhan in China's Hubei province in January 2020 (Ciottia et al. 2020). The Covid-19 outbreak was declared a pandemic by the World Health Organization (WHO) on March 11, 2020 (Ajmal et al. 2021). In the first phase, China was severely affected by the pandemic and had to reduce its economic and industrial activities, as well as introduce several quarantines in different cities. In a short time, cases were reported worldwide, and Covid-19 became a global emergency (Farooq et al. 2021).

One of the activities that has been greatly affected by Covid-19 becoming a global pandemic is the maritime industry and supply chain processes. The maritime transport sector, where an average of 90% of world trade is carried out, is also an important transportation system that provides the integration of global economic systems (Akkartal 2021). Maritime transport played an important role in the short-term emergency response to the pandemic by facilitating the transport of important commodities and properties, maintaining employment, and facilitating international trade (Keshta et al. 2020). Many countries had to partially or completely close their borders to prevent the spread of virus. This situation also caused the deterioration of global supply chains due to delays in the flow of goods, capital, and people. After the serious measures taken, many companies have begun to move into a new era to overcome the macroeconomic blow caused by the pandemic (Narasimha et al. 2021). On the other hand, major breakages were created by the effects of Covid-19 pandemic on the supply chain. When the remarkable effects of the pandemic on these processes are examined, it can be seen that the main problems were the increase in cargo waiting times at ports and congestion, due to many ships waiting for loading and unloading. An increase in waiting times at berths causes extra costs for ships. Therefore, this problem also causes decreased productivity and the loss of trade. (Chinedum 2018; Cremaschini and Monaco 2022). Among the top 20 global container ports, the ports of Los Angeles/Long Beach are the busiest container trade gateways in the USA, handling almost all goods from Asia to the USA. Ship waiting times for loading or unloading cargo at those ports reached the record level of the Covid-19 pandemic period in October 2021, with 100 ships waiting (UNCTAD 2021; Gui et al.

Corresponding Author: Mahmut Mollaoğlu **E-mail:** mahmut.mollaoglu@beun.edu.tr
Submitted: 22.09.2022 • **Accepted:** 21.02.2023
This article is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC 4.0)

2022). There were more than 8 days of waiting time from September to mid-December 2021 in both ports (Cremaschini and Monaco 2022). Therefore, these long waiting times and congestion in ports caused serious disruptions in supply chain processes.

A few companies that can be described as the giants of the maritime industry took steps to accelerate support for the end-to-end supply chain needs of customers during the pandemic period. The first example of these initiatives is that CMA CGM Group took an ambitious strategic growth step to provide its customers with first-class logistics services by owning 97.89% of the outstanding shares and voting rights of CEVA logistics, which was tendered on April 16, 2019. CMA CGM Group is able to meet the logistics needs of its customers around the world with a comprehensive solution-oriented spectrum across the supply chain (CMA CGM 2022). Following this strong merger, Maersk acquired Hong Kong-based logistics company LF Logistics, which has outstanding capabilities in omnichannel fulfilment services, inland transportation, and e-commerce in the Asia-Pacific region, developing comprehensive end-to-end global supply chain services (A. P. Moller – Maersk 2022). Recently, another industry giant, MSC Group, has reached an agreement with Bolloré Group to acquire Bolloré Africa Logistics. This further step reaffirmed the Group's longstanding commitment to invest in Africa and strengthen supply chains as well as to connect Africa to the rest of the world (Msc Statement 2022).

The aim of this study is to reveal the factors that caused supply chain integration of liner shipping companies during the pandemic period. Therefore, related studies in the existing literature were examined, and the determined factors were coded. While previous studies only emphasized a single element of supply chain integration, this study handles the elements from a holistic perspective.

In the next part of the study, the literature review is presented on the factors that accelerated the integration of maritime transport companies into the supply chain during the Covid-19 pandemic period. The factors outlined in the next section were coded using the MAXQDA 20 qualitative data analysis program, and their relationships with each other were examined. In the conclusion of the study, the findings are discussed in light of the information obtained from the literature.

2. Literature Review

Many different studies were performed in the related literature, and these studies were duly reviewed. Authors choose the Scopus database in order to reach the broadest range of comprehensive journals. Targeted articles were accessed using the following steps: TITLE-ABS-KEY (Maritime*) AND TITLE-ABS-KEY (Supply Chain*) AND TITLE-ABS-KEY (Covid-19*). According to the search results, 19 articles were chosen. The abstracts of each article were reviewed, and 3 articles were excluded from the scope of the study. The remaining 16 articles were examined for the literature review.

Most of the articles reached in the literature review focused on the effects of Covid-19 on the maritime industry. *Notteboom et al*. (2021) compared the crises that most affected maritime supply chains. *Narasimha et al*. (2021) investigated the negative effects of the Covid-19 pandemic in India. *Tianming et al*. (2021) emphasized that Covid-19 restrictions resulted in a significant loss for the maritime sector. Charlampowicz (2021) underlined that improving service quality is very important to achieve competitive advantage. *Perez et al.* (2021) made a comprehensive comparison between the car carrier ship traffic in the pre-pandemic era and under Covid conditions. *Koyuncu et al.* (2021) emphasized that container shipping actors experienced some serious problems due to the effects of pandemic. *Akyurek* and *Bolat* (2020) approached Covid-19 effects from a different perspective by investigating the inspection trends. They pointed out that with the new-normal inspection regulations, detentions decreased compared to the past. *Verschuur et al*. (2021) investigated the economic effects of the Covid-19 lockdowns on the maritime sector. They indicated that fund allocation helped the economic recovery.

Some studies investigated resilience strategies during the pandemic. *Bathke et al*. (2022) offers detailed scenarios on how to create dynamic capabilities for liner shipping companies to build resilience. *Praharsi et al*. (2021) gave such recommendations as provision of delivery forms, delivery schedule control, automatic data entry, warehouse capacity control, and internal company integration to increase performance during the pandemic.

The rest of the studies in the related literature also reviewed the pandemic situation and predicted the post-pandemic process. *Permal* (2021) predicted that post-pandemic processes might invert the globalization concept. *Donnan et al.* (2020) revealed the alternative resilience strategies for the initiatives that invest in maritime industry in the post-pandemic period. The most prioritized resilience strategy was determined to be rail-road connections. On the other hand, *Kesha et al.* (2020) and *Vano et al*. (2021) emphasized the importance of technological improvement adoption in maritime transportation to overcome the pandemic disruptions. *Dirzka* and *Acciaro* (2022) approached pandemic disruptions from a very different perspective. They perceived the pandemic situation as an opportunity to mitigate the mistakes of global shipping operations. *Lee et al. (2022)* proposed a strategic location for global logistics distribution centers along with the Belt and Road Initiative (BRI).

3. Methodology

Qualitative research attributes meanings, concepts, definitions, characteristics, metaphors, symbols, and descriptions to events and phenomena (Berg 2007). Qualitative research focuses on the examination of practices and the perceptions of participants in regard to processes or activities. Although qualitative research has specific constraints related to the generalizability of the results, contributing to knowledge by finding out the meanings of the research constructs is the main purpose (Wu et al. 2016). The main aim of this study is to determine the motives of liner shipping companies to invest in supply chain integration. Qualitative research was carried out to reveal the relationships between accelerating factors and to better define the effect levels of COVID-19 on the supply chain integration of ship managing companies.

Using software programs was suggested to researchers when it comes to organizing large and complex data sets (Atherton and Elsemore 2007). Therefore, in this study, MAXQDA 20, which is a qualitative data analysis software, was used for the analysis and includes the coding process of motives for supply chain integration. There are also many different applications in the maritime literature on MAXQDA 20 software, such as sustainable development goals, evaluation of the potential barriers for the automation of the twistlock handling process, bibliometric analysis of maritime scientific journals, national maritime policies based on safety, security, and environment, and resilience strategies of ports against the Covid-19 pandemic (Sciberras and Silva 2018; Kugler et al. 2021; Yorulmaz and Barış 2021; Turedi and Ozer-Caylan 2021; Ayaz et al. 2022). In MAXQDA 2020, the MaxMaps Creative Coding Section, Hierarchical Code-Subcodes Model, and Code Co-Occurrence Model were used to visualize the interacting codes and relationships. In the coding process, we firstly gathered the related literature that was explained in a detailed manner in the literature review section. We examined the studies in the literature, and we excluded 3 studies for not fitting the scope of the study. The remaining 16 studies were deeply analyzed and included in the coding process. In the coding process, the evaluations of the authors and experts in the related literature on supply chain integrations of liner shipping companies were coded. Subsequently, continuous comparisons between themes were made, and in conclusion, definite themes were explained. Experts made an assessment before and after the coding and sub-coding process to increase the validity and reliability of this study. In Table 1, the proficiency levels of the experts were presented.

Table 1. Proficiency Levels of the Experts

Expert	Position	Educational Status	Experience
Exp-1	Customer Service Manager	MSc.	16 years
Exp-2	Sales and Marketing Manager	MSc.	16 years
Exp-3	Sales and Marketing Manager	MSc.	17 years
Exp-4	Customer Service Chief	Bachelor	15 years
Exp-5	Sales and Marketing Chief	Bachelor	14 years

The codes revealed from the literature were evaluated in semi-structured interviews with the experts who perform in liner shipping companies in a managerial position. Accordingly, common opinions were reached on the expressive intelligibility of the codes and their suitability in terms of sectoral language integrity.

In Table 1, we present the work experience, educational background, and job titles of the experts. Table 1 demonstrates that each of the five chosen experts has held a managerial position for a minimum of ten years. While three of the experts have a master's degree, the rest have a bachelor's degree. In addition, each of the chosen experts has direct customer experience. Hence, they can easily conduct market research on supply chain integration issues.

4. Findings

This study investigated which factors are effective on the supply chain integration decisions of liner shipping companies, especially during the COVID-19 pandemic period. Thus, the related literature was reviewed, and prominent factors were coded in the MAXQDA 20 program. As a result of the analysis, the coding frequency of these factors and interaction levels of joint-coded factors were revealed and demonstrated in Figure 1.

As seen in Figure 1, the "port congestion" problem, "blank sailing" strategy, and "quarantined vessel" measures in the COVID-19 pandemic period were prominent factors that directed liner shipping companies to gain dominance in the supply chain. It is also seen that the blank sailing strategy and port congestion problem in the liner shipping market have a strong relationship with remainder factors. Additionally, the strongest relationships are seen between "port congestion" and "blank sailing," and

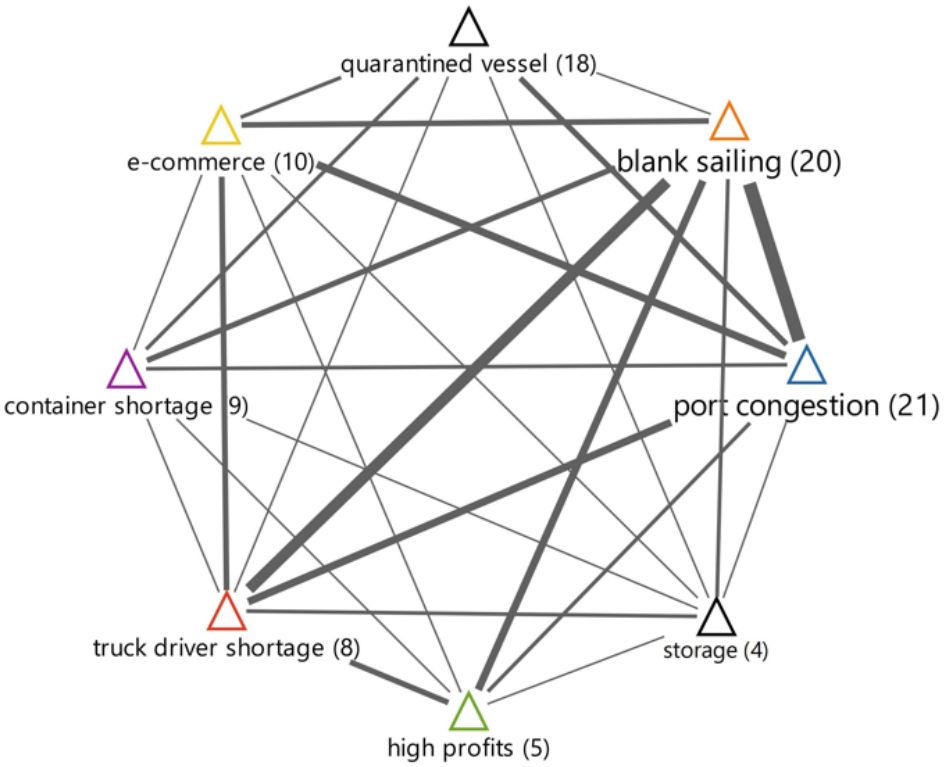

Figure 1. *Frequency and Code Relation Analyses of Factors in the Related Literature*

between "blank sailing" and "truck driver shortage." In Table 2, the frequency of jointly coding entire factors with each other was demonstrated.

Table 2. *Code Relations of Factors that Affect Supply Chain Integration Decisions*

Code System	storage	container shortage	quarantined vessel	truck driver shortage	blank sailing	e-commerce	high profits	port congestion
storage	0	1	1	1	2	1	1	1
container shortage	1	0	4	3	5	4	2	5
quarantined vessel	1	4	0	2	3	3	0	4
truck driver shortage	1	3	2	0	2	3	1	3
blank sailing	2	5	3	2	0	2	3	6
e-commerce	1	4	3	3	2	0	1	5
high profits	1	2	0	1	3	1	0	2
port congestion	1	5	4	3	6	5	2	0

In this study, factors that accelerated the supply chain integration decisions of liner shipping companies during the Covid-19 pandemic period were brought out from the related literature. For this purpose, these factors were coded in the MAXQDA 20 program. In the coding process, the factors were jointly coded several times. In Table 2, the frequency of factors that were jointly coded was displayed. It is seen in Table 2 that "blank sailing" and "port congestion" were jointly coded six times, and this is the highest frequency of any factors jointly coded with each other. It is also seen that the "container shortage" factor was jointly coded

with “blank sailing” and “port congestion” five times. Similarly, the factors “e-commerce” and “port congestion” were jointly coded five times.

With the global changes created by the Covid-19 pandemic in all sectors, it is inevitable that supply chain processes would be affected by these changes. The pandemic has had an impact in a short time in many areas of life, such as the change in working culture, the use of information technology, and consumption habits. Uncertainties during the Covid-19 period have caused high demand for food and cleaning products. With the effect of digitalization and restrictions, people had to shop from their homes. For this reason, e-commerce reached its peak during the pandemic period (Ajmal 2021; Cullinane and Haralambides 2021). Personnel being unprepared for these sudden demand explosions resulted in serious congestion at ports. Due to quarantine practices in ports, ships waiting at anchorage areas for about 14 days caused delays in supply chain processes. On the other hand, cargoes that could reach the port were delayed due to insufficient storage areas and the shortage of personnel available for transshipment (Cremaschini and Monaco 2022). With the emergence of Covid-19 in China, the most strategic point of global industrial production, the slowdown of factory activities as a result of the serious precautions taken by the government, or even the complete closure of the factories, and the inability to deliver the containers reaching the ports to the factories created the problem of container shortage as well as port congestion (Karmaker et al. 2021; Toygar et al. 2022). Liner shipping companies started empty voyage practices in order to compensate for the time lost due to disruptions in supply chain processes. Directing the cargo flow to hub ports and transferring it from one point to other locations by long-distance land transportation is another factor that causes the slowdown of container circulation and, as a direct effect, the shortage of containers. In the Covid-19 period, it is possible to explain the increase in profitability with the concept of blank sailing. Bringing the loads to the designated hub port points provided cost advantages for line operators and had a direct impact on profitability (Kuźmicz 2022; Bucak and Demirel 2022).

5. Conclusion

The Covid-19 pandemic has considerably affected the supply chain as well as all other sectors. The transition to digital processes has been accelerated in all sectors to react to disruptions caused by Covid-19. In order to mitigate the effects of Covid-19 with the least damage, liner shipping companies have implemented some strategies. In the Covid-19 period, it was observed that the supply chain integration of liner shipping companies was accelerated just as occurred with digitalization. Various factors played an important role in the emergence of these integration strategies. In this study, the factors that caused supply chain integration during the Covid-19 period were examined. Relevant factors were coded after a comprehensive literature review, and the network of relations between the factors was revealed.

According to the results of the study, port congestion was the most encoded factor among the factors accelerating supply chain integration. In addition, some liner shipping companies wanted to avoid delays caused by port congestion with priority container applications with the help of their logistics company acquisitions in the pre-Covid-19 period. Another important factor is the blank sailing strategy. Blank sailing practices also paved the way for the formation of container shortages by optimizing the container cycle. This situation generated the strategies of providing cargo flow from feeder ports to hubs or vice versa, and providing cargo flow by long-distance land transport to hub ports. The other factor was the “quarantined vessel.” In this case, supply chain integrations can prevent delays that may occur to regain the time lost in anchoring by reducing dwell time.

It was seen that some factors were used together in the literature. This shows us that there is a relationship between them. The presence of blank sailing and quarantine vessels caused concentration in certain ports. At the same time, the high demand for certain products and the uncertain environment during the pandemic led to an increase in e-commerce and, accordingly, congestion in ports. Supply chain integrations that were implemented to solve these problems reduced costs and saved time.

This study examined the factors that accelerate supply chain integration of liner shipping companies. The limitations of the study are that the supply chain integration concept is new, and the number of studies examining the effects of Covid-19 is very limited. For future studies, the factors obtained from the literature can be examined using various analytical methods such as Best-Worst or the DEMATEL Method, and these factors can be prioritized or the cause-effect relationship between the factors can be revealed.

Peer Review: Externally peer-reviewed.

Conflict of Interest: Authors declared no conflict of interest.

Financial Disclosure: Authors declared no financial support.

Author Contributions:: Conception/Design of Study- G.O., M.M., U.B.; Data Acquisition- G.O., M.M., U.B.; Data Analysis/Interpretation- G.O., M.M., U.B.; Drafting Manuscript- G.O., M.M., U.B. Critical Revision of Manuscript- G.O., M.M., U.B.; Final Approval and Accountability- G.O., M.M., U.B.

REFERENCES

A.P. Moller - Maersk to acquire LF Logistics, a premium omnichannel fulfilment company. (2022, April 27). Retrieved from https://www.maersk.com/news/articles/2021/12/21/apmm-to-acquire-lf-logistics

Ajmal, M.M., Khan, M., Shad, M.K., Alkatheeri, H., & Jabeen, F. (2021). Socio-economic and technological new normal in supply chain management: lessons from COVID-19 pandemic. *The International Journal of Logistics*, 1-26.

Akkartal, G.R. (2021). Uluslararası denizyolu taşımacılığında yaşanan tehditler ve çözüm önerileri. *Beykoz Akademi Dergisi, 9*(2):210-222

Akyurek, E., & Bolat, P. (2020). Port state control at European Union under pandemic outbreak. *European Transport Research Review, 12*(1), 1-13.

Atherton, A.& Elsmore, P. (2007). Structuring qualitative enquiry in management and organization research. Qualitative research in organizations and management: An International Journal, 2(1), 62-77.

Ayaz, İ. S., Bucak, U., Mollaoğlu, M., & Esmer, S. (2022). Resilience Strategies of Ports against Covid-19 in Terms of Chaos Theory. Marine Policy, 146, 1–9.

Bathke, H., Münch, C., Heiko, A., & Hartmann, E. (2022). Building Resilience Through Foresight: The Case of Maritime Container Shipping Firms. *IEEE Transactions on Engineering Management.*

Berg, B. (2007). Qualitative Research Methods for the Social Sciences (6th ed). Boston: Pearson Education.

Bucak, U., & Demirel, H. (2022). Maritime Supply Chain Resilience Applications in the COVID-19 Pandemic. In *Multi-Criteria Decision Analysis* (pp. 55-70). CRC Press.

Charłampowicz, J. (2021). Maritime container terminal service quality in the face of COVID-19 outbreak. Pomorstvo, 35(1), 93-99.

Chinedum, O. (2018). Port congestion determinants and impacts on logistics and supply chain network of five African ports. *Journal of Sustainable Development of Transport and Logistics, 3*(1 (4)), 70-82.

Ciottia, M., Ciccozzib, M., Terrinonic, A., Jiangd, W., Wangd, C., & Bernardinic, S. (2020). The COVID-19 pandemic. *Crıtıcal Revıews In Clınıcal Laboratory Scıences*, 57:365-388.

CMA CGM successfully completes its public tender offer to acquire CEVA Logistics and confirms its position as a leading worldwide transport and logistics group. (2022, April 27). Retrieved from https://www.cma-cgm.com/news/2505/cma-cgm-successfully-completes-its-public-tender-offer-to-acquire-ceva-logistics-and-confirms-its-position-as-a-leading-worldwide-transport-and-logistics-group

Cremaschini F. & Monaco C. (2022). How covid affects global ship trade: a port congestion monitoring based on AIS data and Spatio-Temporal Datacubes from Defined Locations. Italıan Conference On Geomatıcs And Geospatıal Technologıes, 125-136.

Cremaschini F. & Monaco C. (2022). How covid affects global ship trade: a port congestion monitoring based on AIS data and Spatio-Temporal Datacubes from Defined Locations. Italıan Conference On Geomatıcs And Geospatıal Technologıes, 125-136.

Cullinane, K., & Haralambides, H. (2021). Global trends in maritime and port economics: the COVID-19 pandemic and beyond. Maritime Economics & Logistics, 23(3), 369-380.

Dirzka, C., & Acciaro, M. (2022). Global shipping network dynamics during the COVID-19 pandemic's initial phases. *Journal of Transport Geography, 99*, 103265.

Donnan, R. C., Edwards, C. R., Iyer, A. R., Karamete, T., Myers, P. F., Olson, S. E., ... & Lambert, J. H. (2020). Enterprise resilience of maritime container ports to pandemic and other emergent conditions. In *2020 Systems and Information Engineering Design Symposium (SIEDS)* (pp. 1-6). IEEE.

Esteve-Pérez, J., Gutiérrez-Romero, J. E., & Mascaraque-Ramírez, C. (2021). Performance of the Car Carrier Shipping Sector in the Iberian Peninsula under the COVID-19 Scenario. *Journal of Marine Science and Engineering, 9*(11), 1295.

Farooq, M.U., Hussain, A., Masood, T., & Habib, M.S. (2021). Supply Chain Operations Management in Pandemics: A State-of-the-Art Review Inspired by COVID-19. *Sustainability*, 13:1-33.

Gui, D., Wang, H., & Yu, M. (2022). Risk Assessment of Port Congestion Risk during the COVID-19 Pandemic. Journal of Marine Science and Engineering, 10(2), 150.

Karmaker, C. L., Ahmed, T., Ahmed, S., Ali, S. M., Moktadir, M. A., & Kabir, G. (2021). Improving supply chain sustainability in the context of COVID-19 pandemic in an emerging economy: Exploring drivers using an integrated model. S*ustainable production and consumption,26* , 411-427.

Keshta, J., Elmesmary, H., & Obrecht, M. (2020). Investıgatıng the ımpact of Covıd-19 on marıtıme supply chaın sustaınabılıty and technology: a revıew. https://doi.org/10.24264/icams-2020.III.10

Koyuncu, K., Tavacioğlu, L., Gökmen, N., & Arican, U. Ç. (2021). Forecasting COVID-19 impact on RWI/ISL container throughput index by using SARIMA models. *Maritime Policy & Management, 48*(8), 1096-1108.

Kugler, M., Brandenburg, M., & Limant, S. (2021). Automizing the manual link in maritime supply chains? An analysis of twistlock handling automation in container terminals. *Maritime Transport Research, 2*, 100017.

Kuźmicz, K. (2022). Impact of the COVID-19 pandemic disruptions on container transport. *Engineering Management in Production and Services, 14*(2).

Lee, P. T. W., Hu, Z. H., Lee, S., Feng, X., & Notteboom, T. (2022). Strategic locations for logistics distribution centers along the Belt and Road: Explorative analysis and research agenda. *Transport Policy,116* , 24-47.

Msc Statement On Acquisition Of Bolloré Africa Logistics. (2022, April 27). Retrieved from https://www.msc.com/mdg/press/press-releases/2022-march/msc-group-reaches-agreement-with-bollore-group-for.

Narasimha, P.T., Jena, P.R., & Majhi, R. (2021). Impact of COVID-19 on the Indian seaport transportation and maritime supply chain. *Transport Policy*, 110:191–203.

Notteboom, T., Pallis, T., & Rodrigue, J. P. (2021). Disruptions and resilience in global container shipping and ports: the COVID-19 pandemic versus the 2008–2009 financial crisis. *Maritime Economics & Logistics, 23*(2), 179-210.

Permal, S. (2021). Cascading effect of COVID-19: de-globalisation and its impact on global governance. *Australian Journal of Maritime & Ocean Affairs*, 1-9.

Praharsi, Y., Jami'in, M. A., Suhardjito, G., & Wee, H. M. (2021). The application of Lean Six Sigma and supply chain resilience in maritime industry during the era of COVID-19. *International Journal of Lean Six Sigma, 12*(4), 800-834.

Sciberras, L., & Silva, J. R. (2018). The UN's 2030 agenda for sustainable development and the maritime transport domain: The role and challenges of IMO and its stakeholders through a grounded theory perspective. WMU *Journal of Maritime Affairs, 17*(3), 435-459.

Tianming, G., Erokhin, V., Arskiy, A., & Khudzhatov, M. (2021). Has the COVID-19 Pandemic Affected Maritime Connectivity? An Estimation for China and the Polar Silk Road Countries. *Sustainability, 13*(6), 3521.

Toygar, A., Yıldırım, U., & İnegöl, GM (2022). COVID-19 döneminde SWARA-ARAS yöntemlerine dayalı boş konteyner sıkıntısının araştırılması. *Avrupa Taşımacılık Araştırma İncelemesi, 14* (1), 1-17

Turedi, O., & Ozer-Caylan, D. (2021). Developing a grounded theory of national maritime policies based on safety, security and environment. *Journal of International Maritime Safety, Environmental Affairs, and Shipping, 5*(2), 84-97.

UNCTAD. (2021). Review of maritime transport. New York and Geneva: United Nations Publication.

Vaño, R., Lacalle, I., Molina, B., & Palau, C. E. (2021, June). Leveraging IoT and prediction techniques to monitor COVID-19 restrictions in port terminals. In *2021 IEEE 7th World Forum on Internet of Things (WF-IoT)* (pp. 205-210). IEEE.

Verschuur, J., Koks, E. E., & Hall, J. W. (2021). Global economic impacts of COVID-19 lockdown measures stand out in high-frequency shipping data. *PloS one, 16*(4), 1-16.

Wu, Y. P., Thompson, D., Aroian, K. J., McQuaid, E. L. and Deatrick, J. A. (2016). Commentary: Writing and evaluating qualitative research reports. Journal of Pediatric Psychology, 41(5): 493-505.

Yorulmaz, M., & Barış, S. (2021). Journal of ETA Maritime Science Dergisinin Bibliyometrik Analizi. Asya Studies, 5(15), 113-127.

How cite this article

Oral, Gulden., Mollaoglu, Mahmur., & Bucak, Umur. (2023). Evaluating trigger effects of covid-19 on supply chain ıntegration. Journal of Transportation and Logistics, 8(1), 29-35. https://doi.org/10.26650/JTL.2023.1178903