The Global Shipping Sector Amid COVID-19: Challenges and Adaptations to Global Maritime Transportation (2019-2022)

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Abstract

The emergence and spread of novel coronavirus (SARS-CoV-2) has significantly affected the entire world's health and macroeconomic dynamics. Other dominating economic sectors including the global maritime industry, which comprises various areas of expertise, present international employment opportunities and have also undergone substantial stress. The consequences of the outbreak of coronavirus pandemic presented unprecedented challenges to global industries, with the shipping sector bearing a particularly heavy burden. This study comprehensively examines the ripple effects of SARS-CoV-2 on the shipping trade, considering factors for instance disrupted trade routes, labor shortages, and port closures. The research study also aims to contribute insights essential for building a more adaptive and resilient global shipping landscape in the wake of COVID-19 or similar pandemics. A combination of quantitative analysis, historical comparisons, industry insights, and case studies was used in the methodology to examine how COVID-19 would affect shipping volumes, container traffic, and port activities. These methods made it easier to comprehend the pandemic effects on the global shipping industry by incorporating real-world experiences. The results demonstrate that most respondents agree COVID-19 has prominently affected the shipping industry, leading to increased container costs and a greater focus on sustainability and environmental practices. Additionally, while many respondents believe the industry is prepared for future crises, a significant number is confident that shipping companies have adopted new health and safety protocols. The findings demonstrate that 30.6% of companies were significantly impacted by challenges in importing inputs from overseas. Export difficulties have led to decreased domestic sales, exacerbated by increased trade costs due to COVID-19 travel restrictions. In response to the challenges posed, the study proposed practical recommendations to minimize future risks, enhance supply chain resilience, and ensure the uninterrupted flow of global shipping operations.

Keywords: COVID-19 pandemic, Health and safety, Maritime operations, Emergency Resource Management, Global Shipping Industry, Supply Chain

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https://doi.org/10.58932/MULG0044

Introduction

The global economy has been significantly disrupted due to the health risks caused by the coronavirus pandemic. Like many other industries, maritime trade networks, ship calls, and linear shipping routes were particularly interrupted in the first two quarters of 2020 due to the severe spread of the virus. Pakistan's shipping industry has also faced significant challenges because of the pandemic. The pandemic has resulted in border restrictions in supply chain networks, interruptions in international connections, manpower shortages, and the need to enforce social distancing in manufacturing facilities. The World Trade Organization (WTO) reported that the global coronavirus crisis has resulted in a 13-32% decline in world trade (Gruszczynski, 2020).

Pakistan's shipping industry has not been immune to these challenges. Research demonstrates that the coronavirus pandemic caused a considerable drop in cargo volumes in South Africa, a country with similarities to Pakistan in terms of its shipping industry (Seuring et al., 2022). This decline in cargo volumes has been accompanied by a parallel increase in freight rates, putting significant strain on the industry (Rogerson, Svanberg, Altuntas Vural, von Wieding, & Woxenius, 2024). The global pandemic has had a significant negative impact not only on ports located in China, where the outbreak originated but also on ports worldwide that serve the shipping and maritime industry. The industry has encountered various challenges because of the pandemic, including border restrictions affecting airlines and port closures. There has been a decrease in demand for freight, leading to disputes in lay time arbitration and disagreements between vessel owners and charters due to limited time and resources (Tettenborn, 2020).

Additionally, reduced shipping and freight demand has resulted in financial difficulties and bankruptcies for some companies that failed to manage their finances effectively during this period of decreased demand (Kamal & Aydın, 2022).

A severe epidemic of acute respiratory syndrome coronavirus-2 (SARS-CoV-2) was reported in Wuhan city of Hubei province of China in late December 2019. This epidemic infected more than 9720 people up till 31st January 2020, 213 individuals died in China, while 106 people were infected in 19 other countries. The World Health Organization's daily report states that the SARS-CoV-2 epidemic has so far claimed 78,630 cases and 2,747 deaths in China. It has already spread to 46 other countries, with a total of 3664 cases documented by February 27, 2020. The epidemic of novel coronavirus was officially proclaimed a pandemic in March 2020 (Hua & Shaw, 2020). In April of the same year, the Sustainable Development Group, a United Nations organization, determined that the effect of this pandemic health crises extend far beyond. It is significantly affecting societies and economies at their fundamental levels. The emergence of the novel coronavirus has posed significant challenges, leading to disruptions in supply chains, changes in consumer demand

patterns, and travel restrictions that have adversely affected the shipping sector (Notteboom, Pallis, & Rodrigue, 2021).

The COVID-19 pandemic is the second major global crisis since the 2008/2009 financial crisis, causing a recession in many countries. It has raised questions about trade flows, financial stability, economic growth, and reliance on certain economies. The shipping industry was also affected by the previous financial crisis, and now the pandemic has created new challenges for global supply chains, ports, and shipping companies (Grzelakowski & Andrzej, 2022). Changes in consumer demand can quickly impact shipping and port activities, leading to adjustments in strategies and market dynamics (Beškovnik, Zanne, & Golnar, 2022).

The pandemic has disrupted supply chains, decreased consumer demand, and imposed travel restrictions, creating a multitude of challenges for the shipping sector. Ivanov in 2020, reported that COVID-19 has disrupted the supply chains of 94% of the Fortune 1000 companies. Similarly, Nagao in 2021 explained how COVID-19 simultaneously disrupted numerous national and international distribution networks. The maritime division may potentially become uncertain because of disturbance in the international logistics and networking because there may not be enough workers to disassemble more end-of-life (EoL) ships and the vessel transportation to recycling nations may be disrupted despite strong precautions. As the industry grapples with these unprecedented circumstances, it is imperative to thoroughly investigate and understand the multifaceted effects of COVID-19 on global shipping.

Research Methodology

1. Study Design

The online open-access platform was used to conduct a thorough search for quantitative research articles addressing the impact of the SARS-CoV-2 pandemic up till 13th April 2022. For this purpose documented internet sources such as PubMed, Embase, medRxiv, and bioXriv were utilized. The results of these databases were reviewed contextually according to each country's coronavirus Stringency Index (SI), which suggests the degree of stringency of a government’s response to pandemic limitations at a restricted time. The results of a conducted study are based on a digital research questionnaire that was used to measure the impact of the coronavirus pandemic on global maritime trade. The electronic survey comprises various questions showcasing the economic effects of the SARS-CoV-2 pandemic on the global shipping industry.

2. Target Population

The intended audience of the conducted research study includes representatives of the Maritime industry, Freight Forwarders, managers, operators/NVOCC, the Pharma industry, and other industry professionals who make the decisions that propel the global maritime industry.

3. Data Analysis

The methodology employed for data analysis was based on the diagnostic analysis model, and the web-based Likert Scale was utilized for data collection to obtain a deeper comprehension of the inquiries that people have regarding COVID-19. The results obtained from this study were summarized and calculated using MS Office Excel 2013.

Results and Discussions

The study primarily focused on the impact of a pandemic on both local and global shipping players. The individuals involved in the shipping industry were the target audience for the analysis. To gather data, a web-based survey was created and shared with 35 maritime professionals. Out of 35 respondents, 29 individuals participated in which 25 were male and 4 were female, representing various professions associated with the shipping industry. The income level of the majority of respondents ranged from 50000-500000+ and they were holding post-graduation degrees. Regarding hierarchy, most respondents belonged to the middle to upper managerial level.

The results in Fig. 1 show the impact novel Coronavirus (SARS-CoV-2) pandemic on the maritime industry, with most of the respondents agreeing that the coronavirus pandemic has prominently stressed the shipment of products and supply chain management. Fig. 2 shows that maritime professionals were assured that they would successfully navigate through challenges posed by the pandemic. Most professionals believe that the cost of shipping containers has significantly increased in the wake of the pandemic, as shown in Fig 3.

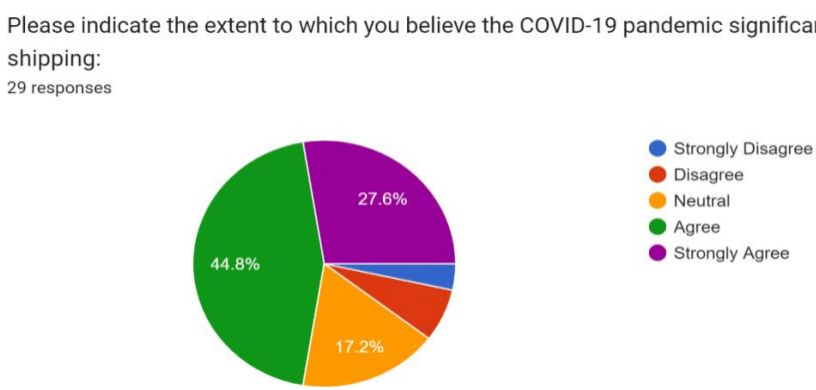

Figure 1: The impact of COVID on the shipping industry

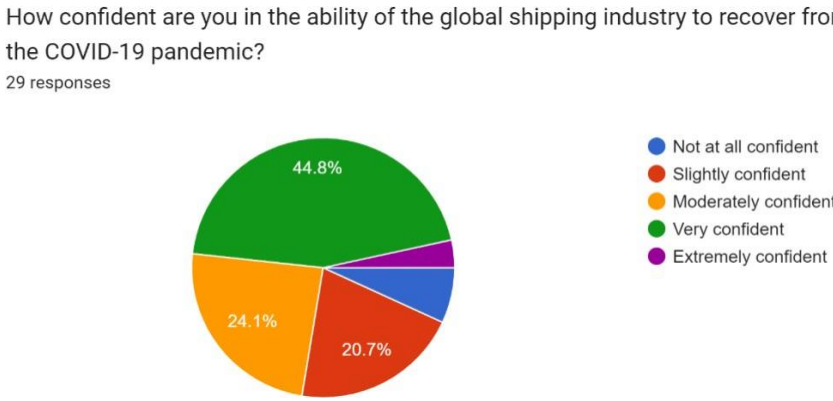

Figure 2: To recover the impact of COVID on the shipping industry

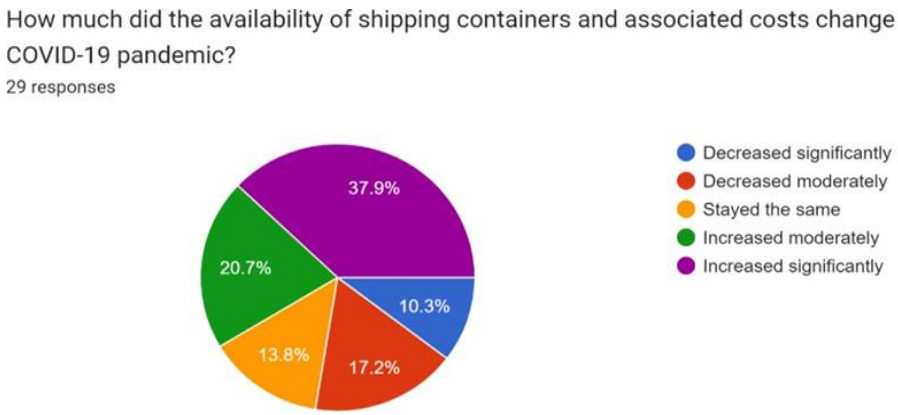

Figure 3: The impact of COVID on the availability of shipping containers and change in cost in the shipping industry

Fig. 4 shows that approximately half of the respondents were neutral, indicating they have no opinion about the government's actions because COVID-19 has severely affected the industry. Meanwhile, some respondents expressed dissatisfaction with the response of governmental and regulatory bodies. Furthermore, half of the respondents agree that the pandemic has led to an increased focus on sustainability and environmental practices due to the rise in cases, as shown in Fig. 5. Fig. 6 shows that approx. half of the respondents think that the maritime shipping industry is prepared and will handle such crises and disruptions in the future Moreover, approximately 70% of respondents were highly sure that shipping

companies have implemented and adopted new protocols and standard operating procedures for health and safety purposes, as shown in Fig. 7.

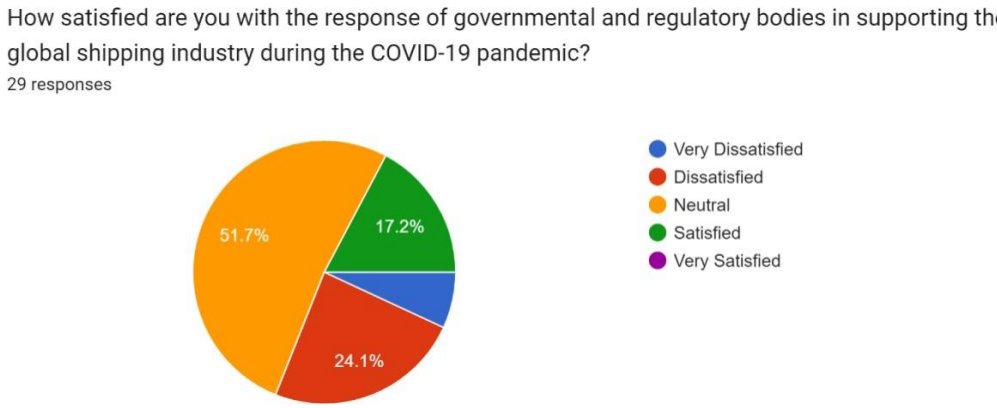

Figure 4: Status of the Government and regulatory bodies' support in the shipping industry during COVID-19

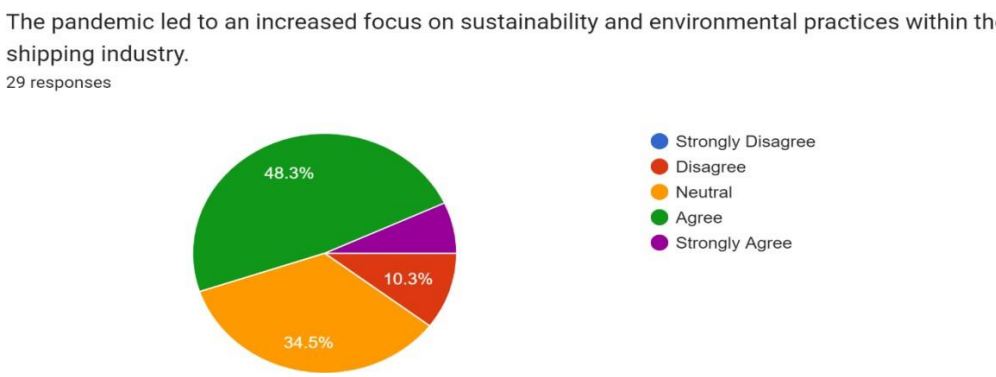

Figure 5: Status of environmental sustainability during the pandemic in the shipping industry

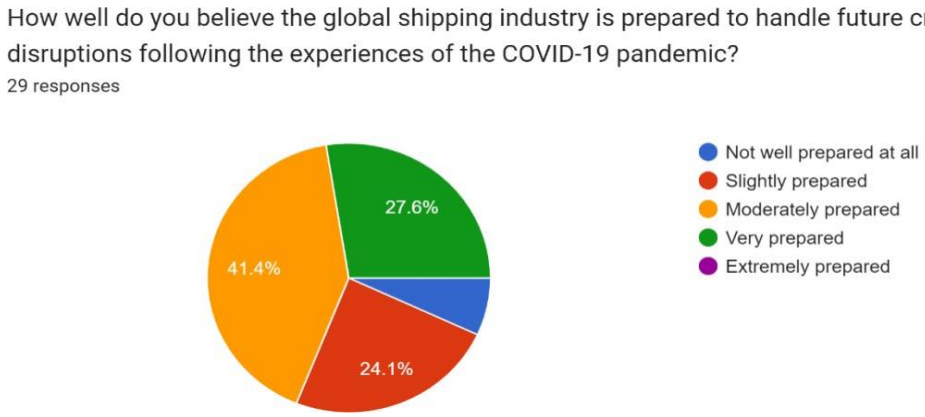

Figure 06: Status of expected future crises in the global shipping industry

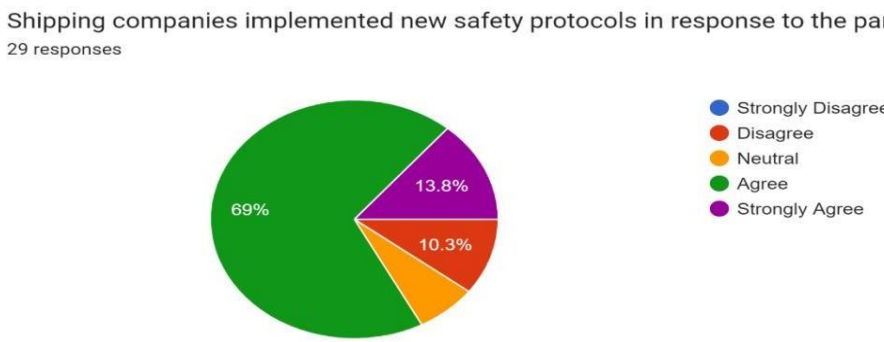

Figure 7: Status of implementation of new SOPs and Protocols of the safety of the shipping companies during the pandemic

The global shipping industry faced numerous challenges and adaptations posed by the SARS-CoV-2 pandemic. While the situation evolved, these disruptions had a significant impact on global trade and logistics. Travel restrictions are one of the steps that governments have taken to stop the COVID-19 virus from spreading (Chung et al., 2021). These actions adhere to the constraints on the individual entrance. All non-essential foreign travel is restricted by temporary entrance restrictions, which also cause international business meetings to be postponed or canceled. Limitations on exposure and social isolation during the SARS-CoV-2 pandemic have impacted the commerce market of tourism-related goods, particularly on transportation costs and international trade. The problem facing international trade

at the moment is the cost of trade, which compared to previous crises, only makes up 10 to 15 percent of the value of commodities. However, a WTO data report from April 2020 claims that because of COVID-19's negative effects, it has increased by 50% as shown in Fig. 8, a serious challenge to global trade as well as producers. According to WTO research, travel and transportation costs account for 33 percent of trade costs related to cross-border transportation and other specialized transportation services (Rubínová & Sebti, 2021).

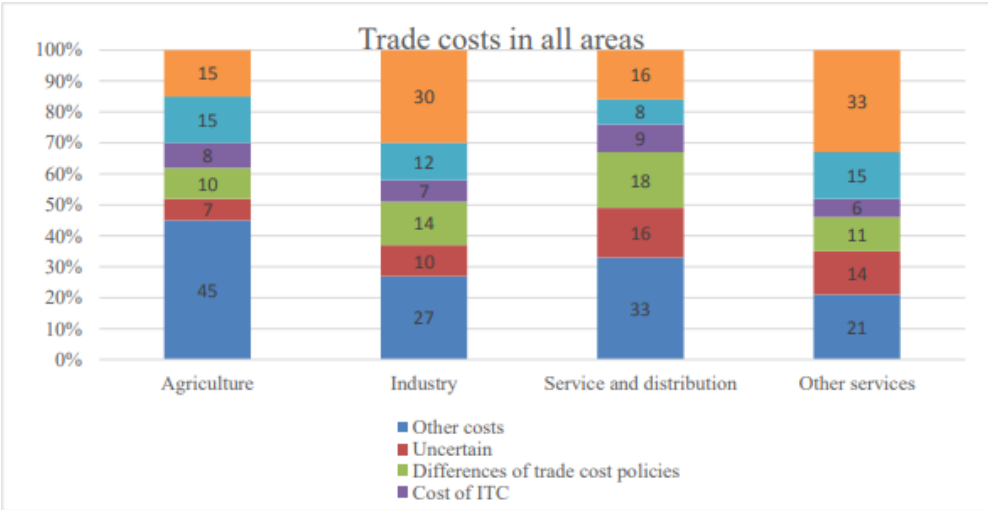

Figure 8: Trade costs in all sectors World Trade Organization (2020)

The growth trajectory of the network remains unchanged despite COVID-19. After three quarters of 2020, there were 752 network nodes, up 64 from the same period in 2019. There are 8093 edges in total, which was 479 more than in 2019. Nodes and edges are growing at rates of 9.3% and 6.3%, respectively. However, the network's connectivity is deteriorating concurrently. Additionally, there was a 2.8% and 20.9% decrease in the average degree and average weighted degree in terms of vessel dimensions or storage capacity. This phenomenon demonstrates that there has been a significant reduction in ship capacity despite a slight decline in connectivity. The framework has become more clustered and consolidated, though, as evidenced by the 4.2% increase in the network's average clustering coefficient. The network's average path length and diameter remain constant, suggesting that the network's overall accessibility is unchanging.

During the first eight months of 2020, there was a 4.4% decrease in port calls compared to the corresponding months in 2019. The mean difference in the volume (measured in million tons or MT) of total trade (imports + exports) from January to August. While in Brazil several ports, the Gulf of Mexico area, the Middle East region,

Australia, the region of South Korea, and the Philippines zone, all experienced a boost in trade industry in 2020 compared to 2019, whereas, the majority of ports, there were decline in total trade reported. Fig. 9 shows the top 20 ports with the biggest volume fluctuations in overall activity of importation and exportation. The ports of Ningbo (China, -68.57 MT), Wuhan (China, -21.65 MT), Tubarao region (Brazil, -20.70 MT), Shanghai (China), Rotterdam (the Netherlands), and Shanghai (China), the most significant changes in volume reported (Verschuur, Koks, & Hall, 2021).

Furthermore, in the main seaports of Ningbo and Shanghai region of China, Rotterdam of Netherlands, biggest import shifts were seen as mentioned in Fig. 10. These ports, along with the other on the list serve as an important entry point for a nation importing finished goods (e.g. New York, New Jersey, and Rotterdam), or they were crucial for particular logistics, for example, Shanghai, Ningbo, Zhoushan known for the manufacturing of electronics and textiles, Ghent, Amsterdam, Rizhou for steel and paper, Yokohama for automobiles, and Krishnapatnam for the import of raw material such as coal. The imperative ports known for the international supply chains such as the port of Ningbo, Tubararo, Novorossiysk, Wuhan, Beaumont, and Dampier have suffered the maximum export and import losses

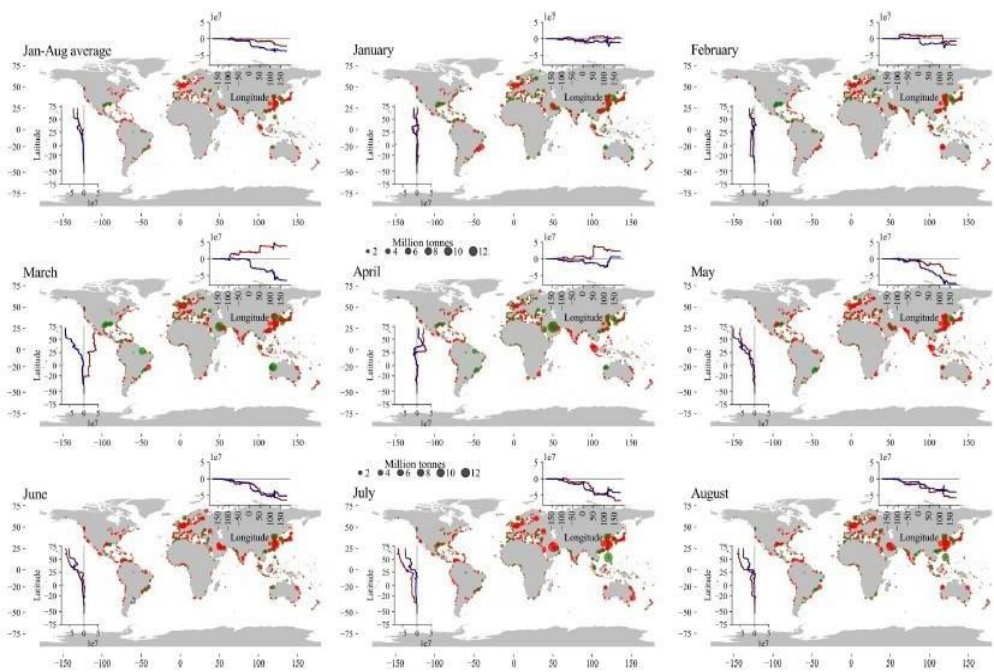

Figure 9: Port-level trade losses over time, Global economic impacts of COVID-19 lockdown measures stand out in high-frequency shipping data

Additional effects included difficulty hiring people, lower freight rates, a shortage of superintendents and servicemen because of the border closure, changes to operating procedures, requests that were canceled, staff divided into groups for different time and location shifts, unpaid clients, fewer ship repair customers, increased business, and contract postponements and cancellations.

These findings demonstrated that, with a ratio of 30.6%, the companies were significantly impacted by the challenge of importing inputs from overseas. Companies have primarily encountered challenges in exporting their goods during this time, which has resulted in decreased domestic sales for companies (Dai et al., 2021). Countries' travel restrictions during the COVID-19 outbreak have significantly increased trade costs. This is mostly because of variations in transportation costs, unpredictability in economic policies, disruptions to individual travel plans, and national policies in reaction to the pandemic. Therefore, the nation's own ICT infrastructure will be crucial to reducing the COVID-19 pandemic's effects recognize and protect seafarers as frontline workers. The maritime industry's collective response, involving key organizations like the ICS and ITF, has been commendable, with coordinated efforts to provide comprehensive guidance and support to mitigate the pandemic's effects. Government support has varied, with financial aid being crucial for businesses to survive the economic downturn caused by the pandemic. United Nations agencies, including the IMO, ILO, WHO, and ICAO, have shown solidarity in addressing the crisis, providing uniform guidelines and ensuring seafarers' health and safety. The WHO's guidelines and the IMO's Circular Letters have been pivotal in managing public health events on ships. Furthermore, The COVID-19 health crisis expedited the transition towards the implementation of advanced digitalization and automation in the maritime sector, proving essential for maintaining operations and enhancing efficiency during such crises.

Conclusion

The COVID-19 pandemic has had a substantial effect on the working criteria within the shipping industry, especially affecting seafarers who are often overlooked yet essential to global trade. The International Transport Workers' Federation (ITF) has emphasized the need to recognize and protect seafarers as frontline workers. The maritime industry's collective response, involving key organizations like the ICS and ITF, has been commendable, with coordinated efforts to provide comprehensive guidance and support to mitigate the pandemic's effects. Government support has varied, with financial aid being crucial for businesses to survive the economic downturn caused by the pandemic. United Nations agencies, including the IMO, ILO, WHO, and ICAO, have shown solidarity in addressing the crisis, providing uniform guidelines and ensuring seafarers' health and safety. The WHO's guidelines and the IMO's Circular Letters have been pivotal in managing public health events on ships. Furthermore, the pandemic has sped up the implementation of digitization and automation in the maritime sector, proving essential for maintaining operations and

enhancing efficiency during such crises. The COVID-19 pandemic has shown that digitization and automation are now necessities and the most practical ways to maintain maritime operations, even though information and communication systems and technologies have been used to increase operational efficiency.

Invest in advanced surveillance and early detection systems to identify potential outbreaks quickly. Early detection systems are integral in mitigating the impact of pandemics by identifying and responding to potential threats at their inception. Global and local surveillance networks play a pivotal role in real-time monitoring, fostering information exchange among countries and international health organizations. Leveraging big data analytics and machine learning models enhances the speed and accuracy of outbreak detection by analyzing diverse datasets, including clinical and environmental information. Additionally, remote sensing technologies and advanced monitoring, including syndromic and event-based surveillance, contribute to early indications of emerging health threat.

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