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DENİZCİLİK İŞLETMELERİ YÖNETİMİNDE TEKNOLOJİ, POLİTİKA VE ÇEVRE PERSPEKTİFLERİNDE ANALİZİ

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ÖZET

Denizcilik Yönetimi, denizcilik sektöründeki ticari faaliyetlerin planlanması, organize edilmesi, yönetilmesi ve kontrol edilmesi sürecidir. Tüm gemilerin, limanların ve diğer tüm deniz tesislerinin işletim prosedürlerini kapsar. Denizcilik işletmelerinde iletişim, denizcilik operasyonlarının sürekliliği ve güvenliği için kritik öneme sahiptir ve gemilerin seyrini yönetmek, liman operasyonlarını koordine etmek ve deniz güvenliğini sağlamak için gereklidir. Bu teknolojik ilerleme, denizcilik sektöründe siber güvenliğin önemini vurgulamaktadır. Bu çalışma, denizcilik operasyonel iletişim ağlarındaki teknolojik yeniliklerin ve gelişmelerin etkisini politik, teknolojik ve çevresel faktörler açısından incelemektedir. Çalışmada, deniz işletmeciliğindeki teknolojik gelişmelere ilişkin veriler içerik analizi yönetimi ile elde edilmiş ve etkiler PESTEL analizindeki politik, çevresel ve teknolojik değişkenlere göre incelenmiştir. Araştırma bulguları sonucunda sektörün teknolojik gelişmelere rağmen siber tehditlerle karşı karşıya kalabileceği ve yatırım planlamasının daha etkin yapılması gerektiği ortaya çıkmıştır.

Anahtar Kelimeler: DENİZCİLİK İŞLETMELERİ YÖNETİMİ, LOJİSTİK, SİBER GÜVENLİK, KÜRESEL TİCARET, TEKNOLOJİ

ANALYSIS OF MARITIME BUSINESS MANAGEMENT IN THE PERSPECTIVES OF TECHNOLOGY, POLITICS AND ENVIRONMENT

ABSTRACT

Maritime Management is the process of planning, organizing, managing, and controlling the commercial activities in the maritime sector. It covers the operating procedures of all vessels, ports, and all other marine facilities. Communication in maritime businesses is critical to the continuity and safety of maritime operations and is essential to managing vessels' navigation, coordinating port operations, and ensuring maritime security. This technological advancement highlights the importance of cybersecurity in the marine industry. This study examines the impact of technological innovations and developments in maritime operational communication networks in terms of political, technological, and environmental factors. In the study, data on technological developments in marine management were obtained through content analysis management, and the effects were examined according to the political, environmental, and technological variables in the PESTEL analysis. As a result of the research findings, it has been revealed that the sector may face cyber threats despite technological developments and that investment planning should be carried out more effectively.

Keywords: MARITIME BUSINESS MANAGEMENT, LOGISTICS, CYBER SECURITY, GLOBAL TRADE, TECHNOLOGY

1. INTRODUCTION

With the establishment of international peace and security, a safer environment emerged, and states began to work more on technological research. Especially after the 1960s, the introduction of cyberspace into our lives as a new dimension, the development of satellite technologies, and the use of the internet, which became widespread after 1990, caused the world to become a global village. As the world has become a global village, it has primarily led to the development of communication and telecommunication technologies, and this development has caused international trade to become safer. The development of communication and telecommunication systems has paved the way for the formation of logistics 4.0. While establishing their bilateral relations, states primarily work on developing commercial ties and trying to create a safer trade ground by getting support from international institutions and organizations. Creating a safe trade ground has been essential for developing and securing maritime trade with national and international regulations. Since 80% of global trade and 70% of its value is carried out by naval transport, states and non-state actors have always focused on maritime transport and maritime security (Germir, 2022). In light of the support of conditions and technological developments, international companies have emerged and provided consultancy services in marine business insurance, communications, and security, creating a new market area.

2. LITERATURE REVIEW

COMMUNICATION AND CYBER SECURITY IN MARITIME BUSINESS

The internet, which has rapidly become a part of our lives after 1990, and cyberspace, which has developed in parallel with the development of the internet, have not only caused significant changes in our lives and the use of new technologies but also caused the emergence of problems that deeply affect our lives. As in all sectors, the maritime industry (Port operators, ship equipment manufacturers, marina facility operators, agencies, ports, etc.) carries out all its activities through computer

systems that they believe are fast and secure (Algantürk Light, 2019). However, accounts, personnel information, plans, and management strategies connected to computer systems have always been under threat due to their free circulation in cyberspace. Nowadays, cyberspace is an area that needs to be given great importance, and R&D (Research & Development) studies should be carried out. Telecommunication and automation systems have not been brought to the fore much, and many companies and organizations have faced significant losses due to insufficient attention to cyber-attacks.

The disruption of global trade after Covid 19 has led to the rapid development of internet and computer technologies, and companies have also accelerated their digital transformation efforts. However, even though companies did not engage in commercial activities during the digital transformation process, hackers continued to increase their attacks, especially during this period. Attacks in cyberspace were carried out at the lowest level within the scope of the theft of personal data and the highest level within the area of the theft of military and commercial secrets and intelligence activities. Hacker groups have mainly targeted maritime trade and ports, where more than 70% of global trade occurs. There has been a 400% increase in cyber attacks on ports from 2020 to the present (Üstündağ, 2022). Significant attacks are carried out on ports, port operations, and companies. The most significant attack affecting the maritime industry was the NotPetya attack against the Danish logistics and transportation company Maersk in 2017, which caused business interruptions in 76 ports (Punt, at al., 2023). The NotPetya attack has caused great awareness for logistics companies. This attack has become the most concrete example of how cyber-attacks affect the systems that produce, manage, and store data and can disrupt terminals and bridges, electricity and gas distribution, and container transportation (Kapalidis, 2020). Just as cyber-attacks are carried out on companies, cyber-attacks are also carried out on ports. The Barcelona Port attack and the Antwerp Port attack are examples of

these. The Antwerp Port attack occurred between 2011 and 2013 and caused significant economic losses (Weaver, at al., 2020).

Although cyber-attacks against ports and maritime companies cause damage, such as financial losses and limited transaction volume, the continuous advancement of technology will likely cause new cyber-attacks and more significant damages. However, it is not only up to port operators and companies to be prepared for potentially devastating cyber-attacks; government authorities, public institutions and organizations must also develop effective and decisive policies (Punt et al., 2023).

LOGISTICS 4.0

The term 'Industry 4.0' was first defined at the Hannover Fair in Germany in 2011 as the fourth stage of the Industrial Revolution. Its development was based on interconnecting production and distribution units (Özdemir and Özgüner, 2018). In light of technological developments, the concept of Logistics 4.0, re-expressed at the World Economic Forum held in Davos in 2016, emphasized the need to create a new network by integrating new technologies such as artificial intelligence (Shin, at al., 2018). Since the digitalization process is still ongoing, Logistics 4.0 is constantly evolving, and the definitions made before are continually being revised (Roblek, at al., 2016). The answer to the question of why Logistics 4.0 is necessary depends mainly on the need for which it was put forward. Although it was aimed to strengthen the human-machine relationship and create a more efficient production and distribution network, it emerged as a need because cyberspace is more economical and solution-oriented than physical space, and it is easier to maintain and direct permanent control over individuals and companies.

Since the concepts of industry and logistics are complementary, the emergence of Industry 4.0 naturally led to the emergence of Logistics 4.0. Which has driven maritime transportation and management companies to adapt to the globalization movement, develop new products and strategies, and create new areas. In this context,

businesses are at the forefront of issues such as insurance activities in line with the new system in logistics, new generation ships, green ports, lobbying activities to reduce carbon footprint and financial support in preparing climate change reports.

Just as the Industry 4.0 era has made global markets more sustainable, it has also made port operations both environmentally friendly and sustainable. In the study conducted by McKinsey & Company in 2019, it was stated that there is a potential to increase the efficiency of global trade and ports by 15 to 20% with the application of Industry 4.0 (Sarkar and Shankar, 2021). In this context, many European countries have started to take various steps to integrate Industry 4.0 technologies into their ports. The first concrete step has been taken to investigate more efficient and faster work in the container handling sector within the scope of the European Commission's "Connecting Europe Facility" (CEF) project (Port Technology Internatıonal, 2019; Sarkar and Shankar, 2021). With the emergence of Logistics 4.0, the International Maritime Organization has revised the definition and scope of ships:

"First degree: Sailors are on board to check the ship's systems and controls and can take control.

Second degree: Semi-Autonomous ship. The ship is controlled and operated via remote access, but sailors are on board to manage and use the systems and control mechanisms.

Third degree: Autonomous ship. It is operated and controlled by remote access without any sailors on board.

Fourth degree: Fully autonomous ship. The ship's operating system can make decisions and act independently. Artificial intelligence is actively working." (Maritime Safety Committee, 2018).

With Logistics 4.0, port services not only reduce container handling costs and prevent incorrect loading of containers on ships and port accidents but also provide convenience in reducing insurance costs in cargo transportation and creating financial savings for businesses with an efficient working model in narrow areas. To give the

mentioned facilities, ships suitable for Logistics 4.0 must be built. Companies wanted to reduce company costs and prevent environmental damage by building high-tech ships. China's Yunzhou Tech has unveiled the world's first electric and remote-controlled container ship, the Jin Dou Yun 0 Hao. Rolls-Royce Marine and Finferries have developed the fully autonomous Falco ferry as part of the Safer Ship with Autonomous Navigation project. Examples include the ferry with the system and the intelligent ship ReVolt of the Norwegian company DNV GL (Yorulmaz and Karabulut, 2021).

In addition to the production of intelligent ships, LTE/5G technology is also used to ensure information sharing and Communication with each other. In 2020, the South Korean company produced a fully autonomous trailer called Samsung T-8, which travelled 10 km in autonomous mode and actively used GPS and radar systems to detect obstacles and other marine vehicles within a 1 km radius (Koznowski and Lebkowski, 2022).

POLICY AND SCOPE OF ACTIVITY OF INTERNATIONAL ORGANIZATIONS AND INSTITUTIONS IN THE MARITIME FIELD

LLYOD COMPANY

The history of the company, which started with Edward Lloyd, a merchant and owner of Lloyd's Coffee House in England in the 1680s, expanded its scope and authority with the mighty names of the period, such as Cuthbert Heath and Admiral Lord Nelson, bringing merchants and shipowners together, and providing maritime services with pennants placed on masts on ships. It has become a powerful company where intelligence is collected, processed, and carried out insurance transactions (Lloyd's, 2023). The company, which today provides the essential insurance service for global trade and maritime businesses, has collected important marine intelligence data for England along with the slave trade in the past. In 1834, when U.K. parliament member George Richard Robinson became president, a broad bill was passed, stamp

data on policies was reduced, the agency system was expanded, and Lloyd's Register, a maritime classification society composed entirely of scientists, was established (Lloyd's, 2023).

As the world entered the digitalization process, all sectors entered a mandatory change process, which caused shipbuilding, ship management, and ship technologies to enter a change process. In particular, to realize the majority of global trade through maritime trade and to meet faster and safer delivery of the needs of demanding customers, new technological products have been added, and the decision-making mechanism and communication systems have been integrated with new technologies, thus increasing efficiency both on land and at sea (Dalaklis, at al., 2020). With the development of satellite systems, the emergence of new GPS technologies, and robust signal technologies, real-time land-sea communications are possible with marine vessels. In this context, to cope with the difficulties experienced in integrating technologies emerging with digitalization, international organizations, states, and companies have developed new strategies and undertaken essential tasks in integrating Industry 4.0 (Ichimura, at al., 2022). Lloyd's company, which took an active role in this process, entered a rapid change process by considering innovative developments and technologies. The company, which is currently involved in various initiatives for the safe transportation of containers, does not only carry out transportation and insurance activities. Scientists working at Lloyd's Register have the power to control all maritime traffic by researching issues such as measuring the topological structure of the global container transportation network, determining global strategies, understanding biological invasions in the seas and oceans, and mapping key and essential ports in container transportation (Kosowska-Stamirowska, at al., 2016).

Lloyd's company is among the companies that strongly support Industry 4.0. In this context, the company has undergone structural changes. First, London's Electronic Placement Platform was launched in 2016 to modernize the London market. In 2018,

Lloyd's Lab was established to improve insurance innovation, develop new products, and increase incentives, and in 2022, it began work with the U.K. Government and industry experts on the development of the Earth and Space Sustainability Initiative (Lloyd's, 2023).

THE ASSOCIATION OF SOUTHEAST ASIAN NATIONS (ASEAN)

The organization was established in 1967 with the participation of the Philippines, Malaysia, Taiwan, Indonesia, and Singapore to strengthen Communication, find peace in Southeast Asia's economic, cultural, social, and technical fields, and determine the balance policy (Baştuğ, 2022). Due to low labour costs, world-famous brands have shifted their production to the Asian region, causing an increase in the trade of the regional states. The sea route has been chosen as a fast and effective means of transportation, and most of the world trade is carried out from the Asian region. Under the current economic conditions, the existence of ASEAN has become critical. In light of the increasing export data of member states, ASEAN decided to establish the ASEAN Economic Community in 2015 to create a single shipping market area and realize qualified exports, as well as the Draft Plan for the Implementation of the ASEAN Single Maritime Transport Market (ASSM) to increase the trade volume among ASEAN member states. A road map for integrated and competitive maritime transport in ASEAN was decided to be created (Nguyen, 2016).

Within the scope of the ASEAN Single Maritime Transport Market project, which was accepted among member states in 2015, Member states have determined a road map by making their legal regulations. In this context, increasing the Ro-Ro transportation network among all member countries, developing inland waterway transportation in an effective and integrated manner, updating navigation and communication devices with the latest technologies, increasing dialogue between ASEAN member states, developing and improving transportation security within the scope of Logistics 4.0 decisions have been taken to increase the capacity and

performance of the 47 ports determined by ASEAN and to equip or improve the designated ports with the latest technological facilities (Nguyen, 2016). Since member states have different economic structures and different types of ports, full integration has not progressed properly, but integration efforts between member states are continuing (Tongzon and Lee, 2015).

THE QUADRILATERAL SECURITY DIALOGUE (QUAD)

While humanitarian aid was being carried out after the tsunami in the Indian Ocean in 2004, authorities from the USA, Japan, India, and Australia held a preliminary dialogue on security issues, leading to an essential step in establishing QUAD. After this process, QUAD began to be known as the quadripartite security cooperation (Ba, 2023). The report published by the American National Intelligence Council 2004 influenced the USA's presence in the region with humanitarian aid and its subsequent return to security cooperation through negotiations. In the report mentioned above, the rise of global states such as China and India in Southeast Asia disturbed the USA and the desire to have active relations with India, which is close to it, to contain China (Rehman, 2009). In 2006, then-Japanese Prime Minister Shinzo Abe renewed his call for Japan to cooperate with countries that share fundamental universal values. During the ASEAN Regional Forum 2007, officials from the USA, Japan, India, and Australia held the first QUAD meeting in Manila and discussed Southeast Asia. It has also emerged as a new structure against China and the international organization ASEAN in the eyes of the state (Ba, 2023).

The presence of both ASEAN and structures such as QUAD against China, which is influential in maritime trade, has also led to hot debates. This has caused new problems for China, which currently has border and marine jurisdiction problems with the states within ASEAN, such as India and Australia. However, the approaches, statements, and lack of joint declarations and opinions of the member states caused the formation of an informal alliance and even its stillbirth (Bhaskar, 2020). Zala states in his article that the situation of the Group of 4 could not reveal anything significant

and that it was stillborn due to the member states' lack of commitment and adequate coordination (Zala, 2018). Although it was intended to prioritize safety in maritime transportation in theory, it remained suspended due to the need for more technical infrastructure and sufficient coordination.

KYOTO PROTOCOL

Although sea freight transportation is efficient in terms of energy and time, it brings some things that could be improved. The biggest concern among these problems is the pollution of seas and oceans and the damage to the ecosystem caused by greenhouse gases resulting from the use of diesel fuel. Long discussions on whether greenhouse gases caused by engines running on diesel fuel, which are preferred in shipping, are harmful or not have delayed the emergence of international regulation (Zheng, at al., 2018). To illustrate, at the general assembly meeting of the European Parliament held on 14-17 September 2020, it was stated that the E.U. and the International Maritime Organization were insufficient in monitoring and reporting CO_2 emissions resulting from maritime transportation and that the necessary laws were passed to reduce the annual average CO_2 emissions per transportation of marine companies and requested that it be put forward (European Parliament, 2020). The European Parliament requests these in response to the decision numbered 2015/757, published in 2015, on the Monitoring, Reporting, and Verification of Carbon Dioxide Emissions from Maritime Transport and amending the Directive 2009/16/E.C. In the context of this decision, the E.U. Parliament, citing the 48% increase in CO_2 emissions in international maritime transportation between 1990 and 2007, conducted studies to reduce its effects on the global climate in light of rapidly developing scientific data. Still, the result could not reach the desired level (European Parliament, 2015).

Although scientific data reveal that ships from international maritime trade emit CO_2, no decision was made to reduce global CO_2 emissions in the 2015 Paris Climate Agreement (Zheng, et al., 2018). Although no decision has been taken in the

Paris Climate Agreement, authority has been transferred to the International Maritime Organization (IMO) to develop regulations and determine and supervise emission reduction targets following the Kyoto Protocol. In this context, IMO will encourage the production of all newly built ships following the Energy Efficiency Design Index (EEDI), the scaling of ballast water management systems, and the emergence of new systems by encouraging new technologies and the use of new technologies in shipbuilding and the training of qualified engineers. (Marine Environmental Protection Committee, 2011).

Just as international steps are being taken to regulate international maritime trade and reduce environmental pollution, shipbuilding companies are also taking steps in this context. Kongsberg Maritime company, a Norwegian shipbuilder, has made a significant contribution to the shipping industry by producing Yara Birkeland, a fully electric container ship in which it integrated the latest technologies, such as artificial intelligence and IoT, and has demonstrated the most concrete example of the realization of Logistics 4.0 (Ichimura, at al., 2022).

3. METHODOLOGY OF THE RESEARCH

The research examined the political, technological, and environmental effects of Maritime Management. The research findings were obtained from company activity reports, cyber security policies, and articles published about the companies. The results were analyzed using content, document, and PESTEL analysis methods. Content and document analysis methods were beneficial for obtaining up-to-date data and conducting accurate case analyses. In PESTEL analysis, it is seen how much the central theme of the research can be affected by Political, Economic, Sociological, Technological, Environmental, and Legal factors, and it contributes to making short and long-term plans (Gregoric, 2014). PESTEL analysis helps the business or product adapt to reality more quickly. This study examined PESTEL analysis from political, technological, and environmental perspectives for MSC, COSCO, and A.P. MOLLER-MAERSK maritime enterprises. Three of these effects are evaluated for MSC, while

political and technological variables are assessed for COSCO and A.P. MOLLER-MAERSK, as shown in Figure 1.

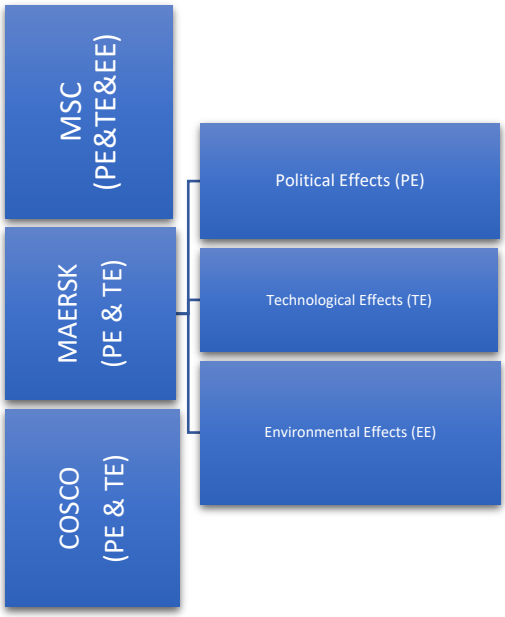

Figure 1. Political, Technological, Environmental Effects

Source: Drawn by Authors

An evaluation of PESTEL analysis for MSC Company is given in Table 1.

Table 1. Findings in PESTEL for MSC

Source: Drawn by Authors

Firm	Politics	Technology	Environment
MSC	Switzerland-based MSC, the world's largest international container shipping company founded in 1970, ranks first with 150 thousand employees and 28.8 billion dollars in revenue (Ahmed, 2024). Due to being a pioneer in the world container trade, there are problems with other states on issues such as unfair competition in different parts of the world. The MSC company was last brought to court in January 2023 due to a complaint submitted to the Federal Maritime Commission by a furniture importer in Pennsylvania. Swiss and U.S. authorities claimed that insufficient documents were introduced to the court and accepted the MSC company to be sued with compensation of 1 million dollars (The Maritime Executive, 2023). Since such companies have rival companies in every region, other states take direct and indirect criminal action against their companies. Since such efforts will continue constantly, it is essential to comply with the legal procedures of other states and establish professional commercial relations.	Although it has taken various security measures to avoid being affected by cyber attacks, the company cannot react at the same speed in the face of the exponential development of computer technologies daily. As with other companies, if cyber security is not given excessive importance, cyber attacks will likely cause network outages and capture of personal data, and valuable cargo carried in containers will become vulnerable targets.	Since MSC is the world's largest container company, other issues of close concern are carbon emissions and climate movements. The company regularly publishes reports on this subject, develops its fleet by purchasing the latest technological ships, and states that it is loyal to the Kyoto Protocol and Paris Agreements accepted by states. MSC company has initiated a decarbonization movement in light of its published information. It has started to use zero-carbon fuels in its fleets and aims to make these fuels increasingly widespread as of 2030 (MSC, 2023). MSC, which contributes to various studies and sustainability projects to reduce its carbon footprint, is affected by cyber-attacks even though it works integrated with new technologies in the digitalizing world.

An evaluation of PESTEL analysis for A.P. MOLLER-MAERSK Company is given in Table 2.

Table 2. Findings in PESTEL for A.P. MOLLER-MAERSK

Source: Drawn by Authors

Firm	Politics	Technology
A.P. MOLLER-MAERSK	Founded in 1904 and headquartered in Copenhagen, the company is the world's largest global container trade company, employing over 100 thousand people and holding a company worth 106 billion dollars (Ahmed, 2024). Due to the company's deep-rooted structure, its developed international trade network, with east-west and north-south axis trade, made it the world's largest container transportation company in 2002 (Fremont, 2007). However, the fact that global competition has continued has led to the development of new companies and the formation of different commercial networks, causing it to leave the top of the list. Companies develop their sphere of influence by establishing relationships with states and non-state actors in commercial competition.	Moller Maersk company is different from other companies. Unlike the classical company approach, it actively uses the power of social media, uses the company as an advertising face among international suppliers, and wants to gain a place in social memory by not only trying to integrate technological developments into its systems (Katona and Sarvary, 2014). Like other companies with which it competes globally, Maersk has determined policies such as developing telecommunication infrastructures, enriching its fleet by purchasing innovative ships, stating it loudly both on social media and on international platforms to reduce its carbon footprint, and developing various policies to create sustainability and green logistics (Maersk, 2024). Maersk company, which closely follows technological developments and the latest developments in the digitalizing world, is taking various initiatives for safer and data integration in its activities in the cyber field. Acting with the motto of cyber security for the digital future, Maersk shows that it attaches more importance to the cyber area than other rival companies by providing personnel for cyber engineer, security engineer, cyber manager, and cyber analyst positions within the company (Maersk, 2023).

An evaluation of the PESTEL analysis of COSCO Company is given in Table 3.

Table 3. Findings in PESTEL for COSCO

Source: Drawn by Authors

Firm	Politics	Technology
COSCO	Founded in 1961, China-based COSCO, the world's 4th largest shipping company and the largest shipping company outside Europe, has a capacity of 2 million containers, 17 thousand employees, and a revenue of 10.2 billion dollars (Ahmed, 2024). Since the company is based in China, its relations with the Chinese government are strong, so much so that it was declared a model company by the Leading Group Office for the Reform of State Economic Enterprises of the State Council of the People's Republic of China in 2022 (COSCO, 2023). Since China is the eastern state in the world system shaped by nation-states on the axis of East and West, various sanctions and restrictions are imposed on large Chinese international companies. For this reason, in the future, nation-states are likely to attempt to prevent COSCO, directly or indirectly, against the interests of their own companies and China's expansionist actions.	COSCO is also on the target list of increasing cyber attacks against shipping companies. While there was no significant loss in the cyber attack on COSCO's U.S. branch, global trade was not disrupted, but there were short-term regional disruptions (Goud, no date). COSCO has a different structure from that of other maritime companies. Since COSCO company is mainly at the center of the Chinese government, its cyber security policies are prepared to use the latest technology, Blockchain technology, and world standards (COSCO, 2020). In this context, COSCO strives to ensure confidence in international trade by integrating the latest technology offered by digitalization into its global system, creating transportation security and ensuring information security (COSCO, 2020).

4. DISCUSSION OF FINDINGS

The study focuses on the development of global positioning systems and their impact on businesses. The assessments presented in the study analyze the advantages and disadvantages of companies adapting to this evolving technology.

Globalization and technological developments have led to the emergence of cyberspace and new communication opportunities. This situation has turned space into a new conflict area. By closely following the activities and research of other nation-states in the room, nation-states are working to develop new satellite communication

tools and reduce the possible effects of possible space conflicts. As states enter the space race, they attach great importance to satellite communication tools to prove their technology's state of the art to other states and increase the communication opportunities of their military elements. Satellite communication tools, which have advantages in terms of global coverage, high capacity, and security, are used for military purposes and have become a cornerstone in the emergence of different technologies. In this context, global positioning systems have been developed, and this situation has been developed by MSC, COSCO, and A.P. MOLLER-MAERSK, which has been the eye of marine vehicles at sea in the maritime industry within the scope of commercial activities, including sectors. In the companies subject to the research, the widespread use of global positioning systems is an essential factor in the instant tracking of commercial ships, rapid reactions in emergencies, finding the direction of intelligent ships in full automation mode, and developing a ship management strategy by identifying obstacles in advance. However, just as every technological development provides convenience, if adequate precautions are not taken, ship losses and the creation of assassination ships can cause companies to experience significant economic losses and disrupt global trade.

6. RESULTS

Today, almost every sector operates in cyberspace, and due to the everyday use of developed technological products in all industries, a cyber-attack or manipulation carried out in cyberspace systematically affects all systems. In particular, attacks on the global positioning system significantly affect merchant ships and restrict or blind their communication facilities. When we examine the companies engaged in container transportation, which form the backbone of global trade, we see that systematic cyber attacks are being carried out. While these attacks are sometimes short-term and cause short-term service interruptions, some can last for months. As a result of these attacks, situations such as the interruption of company-ship Communication, the valuable

cargo carried on ships becoming an open target for pirates, the seizure of companies' trade secrets, and the sale of these secrets to other states or rival companies may occur.

To prevent these attacks, companies hire cyber analysts, cyber security experts, and cyber engineers, who not only serve to secure their companies but also indirectly help ensure global trade security. States and companies have duties to prevent disruption of international trade. Conditions must reduce dependency on foreign technology, develop domestic technologies, and connect them to the global network. This is an essential issue to reduce the possible harms of state technology embargoes in the future. In addition, states are responsible for nationalizing cyber security networks and integrating new technologies to strengthen the position of their companies. They must also protect their companies against cyber-attacks by providing the legal infrastructure and imposing heavy penalties and sanctions. On the other hand, companies have to develop more budget and R&D projects in the cyber field to protect their company assets. Companies with autonomous ship fleets should keep their technological infrastructure up to date.

Maritime management is essential in ensuring the functioning of the global economy, transportation of goods and services worldwide, employment, and the development of technology. Communication in maritime business is critical for the continuity and security of marine operations. Using communication systems, maritime companies can communicate between ships, ports, and other maritime facilities. This Communication is essential to manage the navigation of vessels, coordinate port operations, and ensure maritime safety. Communication in marine management is to manage the ship's navigation, coordinate port operations, and ensure maritime security.

Cyber security is a set of practices, policies, and procedures that protect computer systems, networks, and electronic devices from threats such as unauthorized access, use, modification, disclosure, destruction, or corruption. Cybersecurity in maritime business is critical to protecting the critical infrastructure of the marine

industry. Cyber security threats in a maritime business include Botnet attacks, Data breaches, DDoS attacks, and Malware attacks.

For precautions, it is essential to provide cyber security awareness training to employees, create a framework to protect against cyber security threats by creating cyber security policies and procedures and use security software and hardware to protect against cyber security threats (Herjavec Group, 2019). MSC, COSCO, and A.P. MOLLER-MAERSK companies renew themselves technologically against attacks in terms of cyber security and take the necessary measures in this direction (IMO-MSC, 2017; Chang, at al., 2019; Alcaide and Llave, 2020).

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