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DEPARTMENT OF MARITIME STUDIES

MASTER OF SCIENCE IN SHIPPING

**“THE IMPORTANCE AND EVOLUTION OF
THE PURCHASING DEPARTMENT IN
SHIPPING COMPANIES”**

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Thesis

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ABSTRACT

The purpose of this paper is to describe the importance and evolution of the purchasing department in a shipping company, over the past decades. Admittedly, there is no exact definition in the maritime cluster of the purchasing department and responsibilities of same. Nonetheless, it is of great importance for every ship-owning and or ship management company to maintain a well-organized, healthy, experienced, and trained purchasing department, that is always able to overcome any type of obstacle and be resourceful, ensuring that their vessels will continue to operate safely, without any shortages or technical problems. Communication with other departments such as technical, safety, crewing, operations, law, accounting, and finance is pivotal and can result in a great reduction of expenses. Furthermore, as technology has been developed, various tools have been invented that aim to assist and simplify the processes of purchase, thus reducing the time spent and minimizing the final cost.

ΠΕΡΙΛΗΨΗ

Ο σκοπός της παρακάτω διπλωματικής εργασίας είναι να περιγράψει τη σημαντικότητα αλλά και την εξέλιξη του αγοραστικού τμήματος των ναυτιλιακών επιχειρήσεων τις τελευταίες δεκαετίες. Ομολογουμένως δεν υφίσταται ακριβής ορισμός ή περιγραφή του αγοραστικού τμήματος και των ευθυνών που φέρει αυτό σε μία ναυτιλιακή επιχείρηση. Έτσι λοιπόν, κρίνεται σημαντικό για κάθε πλοιοκτήτρια ή διαχειρίστρια εταιρεία πλοίων να διατηρεί καλά οργανωμένο, υγιές, έμπειρο και άρτια εκπαιδευμένο αγοραστικό τμήμα, το οποίο σε κάθε περίπτωση είναι ικανό να ανταπεξέλθει σε οποιοδήποτε εμπόδιο, όντας ευρηματικό εξασφαλίζοντας κατά αυτό το τρόπο ότι τα πλοία που διαθέτουν θα συνεχίσουν να λειτουργούν με ασφάλεια και χωρίς ελλείψεις ή τεχνικά προβλήματα. Σημαντική κρίνεται και η επικοινωνία που υπάρχει με τα υπόλοιπα τμήματα της εταιρείας όπως το τεχνικό, το ασφαλείας, το πληρωμάτων, το λειτουργικής διαχείρισης, το νομικό, το λογιστικό αλλά και το τμήμα χρηματοδοτήσεων. Επιπροσθέτως, με τη πάροδο του χρόνου και την πρόοδο της τεχνολογίας, διάφορα εργαλεία έχουν αναπτυχθεί τα οποία συμβάλουν στην απλοποίηση της αγοραστικής διαδικασίας αλλά και στην εξοικονόμηση χρόνου και κεφαλαίων.

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INTRODUCTION

Shipping is defined as methods, procedures, and actions that are applied in such a way that a vessel travels safely from one place to another on time (Theotokas, 2011). The shipping industry is about the transportation of commodities and goods by sea, where various parties engage with each other, and is strongly associated with the worldwide economy, being robustly influenced by many factors such as geopolitical crisis, environmental regulations, governments, supply and demand, and many other factors. According to researchers, this activity of shipping dates back to 3000 BC to 1450 AD when the first voyages began for exploration and trading (Stopford, 2009). For instance, more than 80% of world trade such as food, medicine, energy, and other important items are transported by ships. ¹The maritime industry has a long history with continuous changes, that can provide various information from the past which can lead to successful analysis for the future. Shipping is divided into four markets, the freight market, the sale and purchase market, the new building market, and the demolition market which are closely related to each other. ²Another important reference is the shipping market cycle that is strongly influenced by supply and demand, namely the freight rates. There are three types of shipping cycles, the seasonal cycles which last one year, the short cycles which last between three to twelve years and the long cycles which may last up to fifty years. Due to the shipping market being characterized by volatility, the duration of the short cycles and the long cycles or trends do not have constant durations.

In the past few years' things have changed dramatically from the pandemic COVID-19 to the war in Ukraine, climate change, geopolitics, and regulations have strongly affected the whole supply chain and the process of commodities transportation has become a challenge. However, technology has advanced even more, people have access to more information than ever before, which has led to the progression of various industries, one of which is the shipping industry. Greek shipping has grown and modernized as well. Due to new regulations implemented every couple of years, a lot of companies have been led to invest in departments that were not famous a few years before such as the HSQE department (Health Safety Quality Environmental), the ICT

¹ UNCTAD, Review of Maritime Transport 2022.

² Dr. D. Polemis, Presentation of the four Shipping Market.

department (Information Communication Technology) and the purchasing department, with the current structure.

METHODOLOGY

This master's thesis aims to provide a comprehensive analysis of the evolution and trends in purchasing practices within the maritime industry. The research employs a literature review methodology to synthesize existing scholarly literature, industry reports, and case studies related to the purchasing department and its development in the maritime sector and empirical evidence, including direct and or indirect observation and experience. A structured search and analysis of relevant literature will be conducted, focusing on key topics such as strategic sourcing, supplier relationship management, technology adoption, and sustainability initiatives. The synthesis of literature will enable the identification of emerging trends, challenges, and best practices in the field of maritime procurement. The findings of this study will provide a deeper understanding of the purchasing department's role in the maritime industry and deliver valuable insights for practitioners and researchers seeking to enhance procurement practices within the maritime sector.

CHAPTER 1: THE STRUCTURE OF SHIPPING COMPANIES

1.1 GREEK SHIPPING COMPANIES

Shipping companies differ, some companies treat their fleet as assets and they occasionally buy or sell vessels, depending on market conditions and freights. On the other hand, there are more traditional shipping companies, that treat their fleet differently, and focus on long-term of ownership. Additionally, different types of cargo determine the type of vessel, the main categories being Bulk Carriers, Containerships, Tankers, and Passenger and or Vehicle carriers known as Ro-Pax or Ro-Ro respectively. As a matter of fact, Bulk Carriers are used to transport dry bulk commodities such as but not only iron ore, coal and grains, steel, cement, fertilizers, and agricultural products. Containerships are carrying fully loaded containers or less than container-loaded containers and their main characteristic is that they are following a planned route and fixed schedules. Tankers on the contrary, just like bulk carriers are providing tramp services meaning that they do not follow any strict schedule or planned route and are transporting liquid cargoes such as crude oil, petroleum products,

chemical liquids, vegetable oils, and even gases such as Liquefied Natural Gas and Liquefied Petroleum Gas both known as LNG and LPG respectively. Last but not least, passenger carriers and or vehicle carriers are carrying people and vehicles, for example, a cruise ship that has a fixed schedule with a departure port and terminal port, this category is based on passenger shipping. Given the above, shipping companies may vary from owning only one type of fleet or owning a diverse fleet.

Relying on the aforementioned, shipping companies may have different structures even if they are managing the same type of fleets, but their structure is of critical importance for decision-making and for the strategy they will follow. However, the typical structure of a shipping company consists of the board of directors or the owners, General Manager or Chief Executive Officer (CEO), the Designated Person Ashore (DPA) and Company Security Officer (CSO), the technical director, the operations manager, the chartering manager, the human resources manager, the HSQE manager, the purchasing manager, the crewing manager, the ICT manager, the finance and accounts manager, the claims and insurance manager and the legal representative. The following figure is an example of the structure and hierarchy of a Greek NASDAQ-listed shipping company, Danaos Corporation.



Source: Danaos Corporation Structure & Organization

Greece owns the largest merchant fleet in the world, with Greek shipowners having more than 5.500 vessels under their control or approximately 21% of the entire global fleet in terms of DWT capacity which has grown by more than 45% in comparison to 2014 and managed to rise as well even during the pandemic COVID-19. Another characteristic of the Greek shipowners is that they are considered as strong traders, they transport cargo between third countries, thus gaining the advantage over the perfect competition. Furthermore, it is worth mentioning that Greek shipowners invest in technologically advanced ships, with high energy efficiency and environmentally

friendly equipment, while retaining an average age of vessels of less than ten years.³ The most recent example is one of the most environmentally friendly to date, the Very Large Crude Carrier (VLCC) in the world with over 320.000 DWT, the Maria A. Angelicoussis, LNG powered with dual-fuel engine, being the second of the four to be handed to her owners, Maran Tankers Management.



Source: www.maritimes.gr, Maria A. Angelicoussis VLCC

1.2 BOARD OF DIRECTORS AND CEO

The Board of Directors as in every type of company, is comprised of the owners and the company's main shareholders, who provide information and guidance to the Chief Executive Officer (CEO) of the organization. The CEO is the main connection between the highest layers of a company and the lower layers of it. Its main duty is to report to the Board of Directors and pass information and guidance from them to the manager of each department, while maintaining excellent relations with external partners such as government, banks, flag states, suppliers, insurance agencies, local authorities, etc. It is of great importance to receive feedback and updates regarding the progression and the possible troubles that have been faced by each department, while being experienced enough to undertake hard tasks overcoming various obstacles.

³ Union of Greek Shipowners (UGS), Characteristics of the Greek-Owned fleet.

Lastly, the CEO must always be aware of the current global market, regulations, and laws.

Overall, the CEO of a shipping company is responsible for leading the organization, setting its strategic direction, ensuring operational efficiency, managing key relationships, and driving the company's growth and success in a highly competitive industry.

1.3 DPA AND CSO

The role of the Designated Person Ashore (DPA) is crucial, affecting and determining the relationship of the ship to the shore management, being responsible for the safety and the efficiency of the vessel's operation, organizing safety audits, reporting deficiencies, and monitoring actions taken to resolve issues. This role also includes knowledge and strict adherence to the International Safety Management Code (ISM Code), which defines safety at sea, hindrance of human injuries or loss of life, and prevention of environmental damage.

As far as the Company Security Officer's (CSO) role is concerned, every shipping company is obliged to appoint one person according to the International Ship and Port Facility Security Code (ISPS), he or she is in charge of developing the Ship Security Plan (SSP) and Ship Security Assessment (SSA), planning internal audits and reviews of security activities, modifying the ship's security plan in case of need, enhancing the security awareness of the crew, ensuring that the vessel personnel are well-trained regarding these matters.⁴

1.4 TECHNICAL DEPARTMENT

The technical department is one of the most important and decisive in terms of strategy and budgeting, with various responsibilities regarding the fleet and its proper maintenance, in some cases technical director may even report to the owner directly. The department usually consists of the technical director, the technical superintendents who are in charge of a fleet of between three to six vessels, their assistants' superintendents, and the technical coordinators. Their main duties are monitoring vessels' monthly performance and filing inspection and deficiency reports, ensuring

⁴ Marine Insight, Raunek, 2021, What are the Duties of Ship's Company Security Officer (CSO)?

that vessels comply with safety and quality regulations, and taking preventive measures in case of noticing wear on any type of equipment while keeping records of all the above. Communication with the ship crew is important too, as sometimes troubleshooting decisions must be made remotely without physical access and evaluation of the problem.

The technical department is actively participating in dry docks preparing in advance all files and spare parts that may be needed, planning repairs, reconditionings and retrofitting's. Vessels are obliged to pass special surveys every five years, where class renewal occurs after verification that the structure, equipment and other auxiliary types of machinery are in a good condition without any damages or high-risk flaws. In case company decides to buy a second-hand vessel, technical department assists the inspection to the hull and the machinery of the vessel as well as the equipment of it and is of great importance for the final purchase price to be agreed by both sides.

It is worth noting that the technical department constantly communicates with operations department for the renewal of various vessel certificates, with HSQE department for the supply of various safety equipment and the purchasing department, guiding the spare parts needed for each vessel.

Finally, yet importantly, the technical department along with the purchasing department, are planning the yearly budget, trying to forecast possible costs for each vessel, assisting the accounts and finance department to set goals and thus provide economic plan to the CEO and owners.

1.5 OPERATIONS DEPARTMENT

The operation's department major role is the planning of day-to-day activities of the ship, ensuring safe going and efficient voyage ensuring that the vessel and crew comply with company's charterers and international policies and requirements. Furthermore, closely monitoring vessel's operating costs and round-the-clock communication with agents. Regularly there is an operations manager, who has served as captain and has extended sea-going experience providing guidance to the officers of the department and the assistants as well. This department has constant communication with the vessel and its captain making sure that it operates smooth and safely, while looking after vessels need at sea or ports. In some companies, the operations department

guide the purchasing department for buying deck maintenance equipment, greases and lubricants, windlasses, and ropes.

1.6 CHARTERING DEPARTMENT

The chartering department of a shipping company is responsible for chartering vessels and managing the chartering process. This department also consists of the chartering manager and the officers, their primary duties revolve around negotiating and arranging the hire or lease of ships to meet the transportation needs of the company or its clients. The chartering department conducts market research and analysis to stay informed about vessel availability, prevailing market rates, and trends. They assess market conditions to make informed decisions regarding chartering strategies and negotiations. It also ensures compliance with the terms and obligations stated in the charter party agreements. They monitor vessel performance, including speed, fuel consumption, and cargo handling, to ensure compliance with contractual obligations and manage risks associated with chartering, such as market fluctuations, vessel availability, and potential disruptions. The chartering department identifies risk factors, develops contingency plans, and implements risk mitigation strategies to minimize the impact on operations and financial performance.

To summarize, the chartering department plays a crucial role in securing vessel capacity, negotiating charter contracts, and optimizing shipping operations. They balance the company's requirements, market conditions, and financial objectives to make informed decisions and contribute to the success of the shipping company.

1.7 HUMAN RESOURCES DEPARTMENT

The human resources (HR) department of a shipping company is responsible for managing various aspects related to the company's employees and workforce. Their primary responsibilities are attracting, recruiting, developing, and retaining a skilled and motivated workforce. Usually, the person in charge of the department is the HR manager and the officers below. HR is responsible for attracting and selecting qualified candidates for various positions within the shipping company. This includes creating job descriptions, advertising vacancies, screening resumes, conducting interviews, and coordinating the selection procedure. HR oversees the performance management process, including goal setting, performance evaluations, and feedback sessions. They

work with managers to establish performance metrics, identify training needs, and provide support for employee development and improvement.

This department manages the compensation and benefits programs for employees. They establish salary structures, administer payroll, and handle employee benefits, such as health insurance, retirement plans, leave policies, and other perks. HR identifies training needs and coordinates employee development programs. They provide opportunities for skill enhancement, professional growth, and career advancement through training sessions, workshops, mentorship programs, and educational initiatives. Additionally, ensures compliance with employment laws, regulations, and industry-specific requirements. They stay updated on labor laws, safety regulations, and other legal obligations, and ensure that the company follows proper practices related to employment, workplace safety, and diversity and inclusion.

The HR department acts as a strategic partner, supporting the company's overall goals and objectives by managing the human capital effectively. They are responsible for creating a positive work environment, attracting and retaining talent, and ensuring compliance with employment laws and regulations.

1.8 HEALTH, SAFETY, QUALITY AND ENVIRONMENT DEPARTMENT

The health, safety, quality and environment department or HSQE is one of the most crucial departments, which has grown and advanced rapidly the past years due to various regulations that have been implemented in the maritime cluster. This department is responsible for ensuring the overall safety, quality, and environmental performance of the company's operations and it usually consists of the HSQE manager, which in some cases may be the DPA and or CSO as well, and the officers who might have sea going experience as well, but it is not mandatory.

The HSQE department monitors and ensures compliance with national and international regulations, industry standards, and classification society requirements related to health, safety, quality, and environmental aspects of the shipping industry, also identifies potential risks and hazards associated with the company's operations, conducts risk assessments, and develops risk management strategies to minimize or eliminate risks.

It is important to mention that this department is responsible for implementing the quality management, such as ISO 9001, to guarantee that quality standards and customer requirements are met in the company's operations. For this specific reason, the vetting department which belongs to the HSQE department, plans and executes various internal and external audits and inspections to assess compliance, identify areas for improvement, and verify the effectiveness of safety, quality, and environmental management systems. Vetting, in this context, refers to the meticulous evaluation and scrutiny of vessels, their operational procedures, and associated crew members, primarily aimed at assessing and mitigating risks to uphold safety, security, and environmental standards in the maritime domain. The exigency of the vetting department is rooted in its multifaceted contribution to enhancing maritime safety, averting operational hazards, and ensuring compliance with prevailing international regulations.

To conclude the HSQE department promotes a culture of continuous improvement by identifying opportunities for enhancement, implementing best practices, and driving initiatives to enhance the company's HSQE performance and the vetting department assist on this, by making sure that both vessels and offices can operate smoothly, thus attracting more clients, or better known on maritime industry as charterers.

1.9 PURCHASING DEPARTMENT

The purchasing department in a shipping company is responsible for managing the procurement of goods, equipment, and services required for the company's operations. Their primary duties revolve around sourcing, negotiating contracts, and ensuring timely and cost-effective procurement with guidance provided by the technical department, the operations department and the HSQE department. Traditionally some companies used to separate the spare parts department and the supply department, which is in charge of the stores and provisions, but even in this case, both departments have their officers, and their supervisors and they all report to the purchasing manager.

1.10 CREWING DEPARTMENT

The crewing department in a shipping company routinely consists of the crew manager, who in some cases might have sea experience, and the officers who are receiving instructions from the manager. This department is important as well, because

it manages the recruitment, selection, employment, and welfare of the seafaring personnel or crew, who serve on board the company's ships. They advertise job vacancies, review applications, perform interviews and assess candidates' qualifications, experience, certifications, and medical fitness. Crewing department also ensures compliance with national and international regulations for crew qualifications and licensing, plans and coordinates the deployment of crew members to assigned ships. Moreover, they maintain crew rotation schedules, considering factors such as contract durations, rest periods and crew member availability. This department handles tasks such as keeping personnel records, contracts, and crew databases. They process and verify crew documentation, including visas, passports, seafarers' employment agreements (SEA), and medical certificates. They also manage crew payroll, leave management, and performance evaluations.

Nowadays, shipping companies and their crewing department may engage with crewing agencies or contractors to source seafarers, establish and maintaining relationships with these entities, negotiate contracts, monitor performance, and ensure compliance with agreed terms and conditions. They may also conduct periodic audits or inspections of crewing agencies to assess their compliance with regulatory requirements and quality standards.

Last and most importantly, the crewing department ensures that crew members are adequately trained in emergency procedures, maintain up-to-date emergency contact information, and facilitate communication and assistance during crises such as natural disasters, piracy incidents, or medical emergencies.

1.11 ICT DEPARTMENT

The Information Communication Technology (ICT) department usually consists of the ICT manager and the officers, on some occasions smaller shipping companies may outsource this department. The ICT department in a shipping company has a wide range of responsibilities related to managing and supporting the company's technology infrastructure and systems, including servers, networks, data centers, and communication systems. They ensure that the infrastructure is secure, reliable, and scalable to meet the company's operational needs and systems. The ICT department provides support for hardware devices, such as computers, laptops, printers, and mobile devices used by employees. They also manage software applications, ensuring proper

installation, configuration, and troubleshooting. They handle software licensing, updates, patches to maintain system security and performance, network configuration, troubleshooting, and monitoring to maintain optimal network performance.

The ICT department manages the company's data assets, including storage, backup, and recovery processes. They implement data security measures, such as firewalls, antivirus software, and access controls, to protect sensitive information. They establish data management policies, ensure data integrity, and comply with data protection regulations. coordinates system integration efforts to streamline processes and improve efficiency. They appraise business requirements, design, and develop custom-made software solutions, and integrate various systems for seamless data flow and automation. They may work on developing proprietary software or customize existing solutions to meet the specific needs of the shipping company.

The ICT department sympathizes with the CEO or even the owners, to develop and execute the company's ICT strategy by assessing technology needs, identifying opportunities for improvement, and recommending investments and initiatives aligned with the company's goals. They stay updated on emerging technologies and industry trends to guide the company's digital transformation and innovation efforts.

Although this department did not exist in the past, nowadays is pivotal, having a peak of its blooming from the beginning of the pandemic COVID-19, leading to an extended number of employees working remotely from their homes and new methods of communication both internally and externally having been developed.

1.12 FINANCE, ACCOUNTS AND COST CONTROL DEPARTMENT

The finance, accounts and cost control department manage the financial aspects of the shipping company, this department has its own manager or managers and officers, in some cases the finance manager is different from the cost control manager and the accounting manager, meaning three separate departments as well. The manager or managers of departments report to the CEO and the Top Management.

This department is responsible for communicating with other departments and preparing budgets, and financial forecasts, and conducting financial analysis to support

strategic decision-making by assessing the financial viability of various projects and evaluating their potential risks and returns.

From the side of accounting, they ensure accurate recording of financial transactions, such as invoicing, accounts payable and receivable, payroll processing, and general ledger maintenance. They stick to accounting principles and standards and prepare financial statements (income statement, balance sheet, cash flow statement) regularly. Lastly, this department establishes compliance with tax laws and regulations, prepares and files tax returns, and manages tax planning strategies to optimize the company's tax position.

As far as the financing process is concerned, the department manages the company's cash flow, including monitoring incoming and outgoing funds, maintaining banking relationships, and optimizing cash positions. This involves implementing strategies to ensure sufficient liquidity for daily operations and managing foreign currency transactions, as this is something very common for shipping companies.

The finance and accounts department, under the instructions of the CEO and the owners, is involved in managing the company's capital structure, making decisions regarding debt and equity financing, and optimizing the cost of capital, they. They may also negotiate and manage relationships with banks and other financial institutions. Also, they prepare reports, respond to queries, and take into consideration possible concerns for internal and external stakeholders such as investors, shareholders, financial institutions, auditors, and regulatory authorities.

It is pertinent to note that the main responsibility of the cost control department is cooperating with the purchasing department, the technical department, and the marine department developing and overseeing the annual budgets per category for all of the vessel's operations. This is done by providing a forecasting model for the purchases, needs and expenses, establishing financial objectives, and monitoring the company's spending are all part of this process.

1.13 CLAIMS AND INSURANCE AND LEGAL DEPARTMENT

The claims and insurance department, as well as the legal department, are usually made up of lawyers, with experience in the shipping industry. There are different types

of insurance such as Hull and Machinery insurance (H&M), which covers physical damage or loss to the vessel's hull, machinery, and equipment providing coverage against risks such as collisions, grounding, fire, theft, and natural disasters, the Protect and Indemnity insurance (P&I), covers liabilities and third-party claims arising from the operation of the vessel and including injuries or loss of life, property damage, pollution liability, wreck removal, cargo claims, and legal costs. Additionally, cargo insurance and freight insurance are important too, as well as war risk insurance, loss of hire insurance, and builders risk insurance, when the vessel is under construction or undergoing major renovations.

The legal department collaborates closely with every other department, external legal counsel, and stakeholders to provide legal expertise and protect the company's interests, while also ensuring legal compliance in all aspects of the shipping company's operations.

CHAPTER 2: ANALYSING THE PURCHASING DEPARTMENT

2.1 THE PROCESS

In the past, the purchasing department of shipping companies was not even existing in the form and structure that exists nowadays. At present, communication with vessels has become more and more easier and faster than ever before, making it easier for the purchasing procedure. Firstly, the vessel keeps records of what is needed on board and how urgently it is needed, then after recording the missing items, contacts the purchasing department. An inquiry from the vessel is made, thus the purchasing department knowing the possible voyage plan of the vessel, conducts a search for the most competitive suppliers of the category of requested items taking into consideration the time needed for the items to be ready, the price of the items and the origin as well. Then, depending on the items that have been requested, and after gathering one or more quotations from possible suppliers, the purchasing department contacts the right department to receive advice and guidance on which option should proceed. After the process of offer selection, they place the order with the supplier providing, if necessary, additional information or possible clarifications. Once the order is ready, the supplier alerts the customer, which is the purchaser, informing the dimensions, the weight, and the place where the goods are ready for pick up. The process continues either by assigning the supplier to transport the goods to a port or local warehouse that the

shipping company uses or by the purchaser finds the most cost-effective solution to arrange the collection and then deliver the goods. The final stage of the purchase process is the proof of delivery which must be stamped by the vessel and returned to the office, or the delivery note which can be provided by the agent, again stamped. This enables the purchasing department to proceed with the invoicing procedure and signals the operation closure.

The Purchasing Manager with the assistance of his subordinates and in cooperation with the Technical Fleet Manager and other department Managers, is responsible for a range of purchases. In particular, his responsibility includes the monitoring of purchases such as the Provisions, Lubricants, Chemicals, Gases, Paints, Repair and Maintenance materials, General stores (Cabin stores, Deck stores, Engine stores, Safety stores, Stationary etc.), Medicines, Charts & Publications, Spare parts, Navigation and Communication equipment which are going to be analyzed further.

2.2 RESPONSIBILITIES OF THE PURCHASING MANAGER

The Purchasing Manager reports directly to the Top Management and is responsible for ensuring that the vessels under total management, are managed according to the contractual terms stipulated in the respective management agreement, implementing the purchasing activities in an efficient and cost-effective manner, in compliance with the set budget and procedural requirements adhering to the Code of Business Conduct & Ethics of the Company. Responsibilities include also promoting the planning and coordination of the purchasing activities and ensuring the consistency of the purchasing procedures as per the established Chart of Authorities while constantly reviewing the purchase orders against the budgeted amounts in consultation with the department managers, ensuring the correct allocation of expenses in the respective expense accounts. Furthermore, negotiating with suppliers and analyzing opportunities for contractual agreements. Evaluating the Suppliers' performance in cooperation with the department managers and providing feedback during the budget preparation phase. Facilitating the quarterly financial closing procedure by providing information on the status of the pending to-be-supplied purchase orders and delivering input to the cost control department regarding the vessels' financial performance and operating expenses.

2.3 ROLE AND FUNCTIONALITY OF THE PURCHASING DEPARTMENT

To begin with, it is important to mention some requirements for the selection of the suitable candidate for the purchasing department. The ideal candidate should be educated to a degree level, with understanding of maritime sector, having excellent command of English language and be PC literate. Good communicational skills as well as being able to work within a team, while being willing to learn and adopt to the company's systems and ideas. Same applies in case there are forwarding operators within a company, both of the above report to the Purchasing Manager.

The purchasing department develops supply plans based on the vessel's needs and requirements, collaborating internally with other departments to determine the quantity, quality, and specifications of goods and services to be procured. Afterward, identifies potential suppliers and evaluates their capabilities, delivery time, quality standards, and pricing. They conduct supplier assessments, request, and review proposals, and make informed decisions regarding supplier selection, always guided by either the manager or supervisor of the purchasing department or the department that goods or services are referred.

This department also negotiates the most favorable terms and conditions with suppliers, including pricing, delivery schedules, payment terms and credibility, and warranty agreements making sure that the purchases or contracts align with the company's interests, legal requirements. Due to this process being often repeated, relationships are getting build between the suppliers and the customer, on this case the purchasing department. Managing the relationships with suppliers is essential for long-term partnerships, this way effective communication channels establish, resolve conflicts easier, and records supplier performance issues. Further monitoring supplier compliance with contractual obligations, quality standards, and ethical practices and vice versa, for example due to the Ukrainian war a lot of suppliers and service providers refuse to provide any type of goods or services to vessels that are visiting Russian ports or transport commodities from and to Russia.

The purchasers processes purchase orders based on approved requisitions, keeping accurate and complete documentation, track order status, and coordinate with suppliers to ensure timely delivery of goods and services, due to the pandemic COVID-19 this process has become very difficult, the pandemic influenced global value chains to a

varying degree, largely depending on supply chain configuration, as measured by length and geographical distribution, which provides for an assessment of exposure to network reconfiguration risks.⁵

Some shipping companies, not only to counter the pandemic and ensure timely delivery but also to manage better the purchased goods, have implemented forwarding department, which also reports to purchasing manager. The forwarding department after an order has been placed, checks the most effective options of transportation both in delivery time and cost, while also has constant communication with warehouses that the company uses to consolidate goods. Important to state as well, is the communication with agents worldwide, as in some countries various goods that are stated as dangerous goods cannot even be transported by airfreight, in other cases custom clearance might be time-consuming and not to mention that the delivery on board might be very difficult too.

An alternative option to developing a forwarding department for the aforementioned reasons, is contacting third party forwarding companies and enjoy their services which include all the above responsibilities and report on daily basis to the purchasing department while asking for their permissions for any type of transportation they might be needed to handle. To summarize, from the purchase order and on, the forwarding companies act as mediators, contacting the supplier of the shipping company to arrange a shipping plan either to consolidate goods at the warehouse or directly to the vessel.

2.4 THE FORWARDING OPERATION

After analyzing the process of purchasing and the importance of the actions that follows after placing an order, we will punctuate further the forwarding operation. This department performs a crucial and complex function in streamlining the logistics and transportation of goods along different international supply chains. The duties of it cover a wide range of crucial tasks that are essential for coordinating the effective movement of freight until delivered on board. The role includes merging cargo shipments coming from various sources, also known as consolidation. This entails combining smaller shipments into bigger, more affordable cargoes. This cooperation maximizes transportation effectiveness, improves cargo security, and lowers shipping

⁵ UNCTAD, 2022, Impact of the Covid-19 pandemic on trade and development: Lessons learned.

costs. Operators of this department have the responsibility to choose the best means of transportation for shipments, airfreight, by truck or train or even by sea, whether on a container fully loaded or less than container load. This decision-making process involves weighing various aspects, including the shipment's size, weight, location, urgency, and cost. In order to maximize the effectiveness of logistics, good knowledge of each country's customs is vital as well. This is important as when a vessel is about to call a convenient port, chance is that will receive supplies on time and without problems in custom clearance, making the purchasing and forwarding processes easier, such a port is Rotterdam.

Both the purchasing department along with the forwarding department must be in close cooperation and daily communication with vessel's agent who is the bond between the purchasers and the vessel, providing them with updates and all needed documentation for cargoes that will have to coordinate or even custom clear and arrange safe delivery on board.

2.5 CATEGORIES OF GOODS

The purchasing department as already mentioned, may vary from company to company, for instance in some cases larger companies prefer to differentiate the structure, meaning separated departments which are handling the lubricants, the spares, and stores and provisions. Yet, we are going to examine which are the categories of goods that the purchasing department is managing.

2.5.1 SPARE PARTS

This category of goods refers to the components, equipment, and machinery parts that are specifically designed and used in the maritime industry for ships. These spare parts are essential for the proper functioning, maintenance, and repair of various systems and equipment on board marine vessels. Spares in the shipping industry are a major domain of business, expanding at an exponential rate, saturating the market, and increasing competition for existing traders or manufacturing companies.⁶ There are two

⁶ Somani, A. (2021) "Management and Procurement Of Spares On Ships – How To Identify, Order And Reduce Costs," Marine Insight

main categories of spare parts depending on the group that belongs, these are the engine compartment spare parts and deck compartment spare parts.

Engine compartment mainly consists of:

- Main Engine or widely known as a two-stroke engine, the primary function of it being to generate the power necessary to propel the vessel through the water.
- Auxiliary engines or else known as diesel generators or four-stroke engines, usually ships are equipped with three or four of them and are capable of supporting the vessel, providing electricity, start-up power for the main engine, assisting loading processes and providing heating.
- Main air compressor, which is providing compressed air for various applications and systems on board.
- Pumps, which are crucial for the operation of vessels by transferring fluids from one location to another, such pumps are the ballast pumps, bilge water pumps, sea water pumps, cold or hot water pumps, sewage pumps, cooling pumps, fuel oil pumps, cargo handling pumps and many more.
- Purifiers and separators are essential equipment for the efficient and effective treatment of vessels fluids, primarily fuel and lubricating oil, maintaining the quality and performance of these fluids.
- Propulsion and maneuvering system, which are pivotal for the control of the vessels speed and direction.

Deck compartment mainly consists of:

- Safety equipment, being one of the most important equipment categories, which constitutes of accommodation ladders, lifeboats, emergency lights, signaling devices etc.
- Mooring and anchoring equipment, such as mooring lines and ropes, anchor chains and cables, bollards and cleats, fairleads, windlasses, and winches etc.
- Navigational equipment, including navigation lights, radar and GPS systems, magnetic compasses, eco sounders and depth sensors, Automatic Identification Systems (AIS) equipment etc.

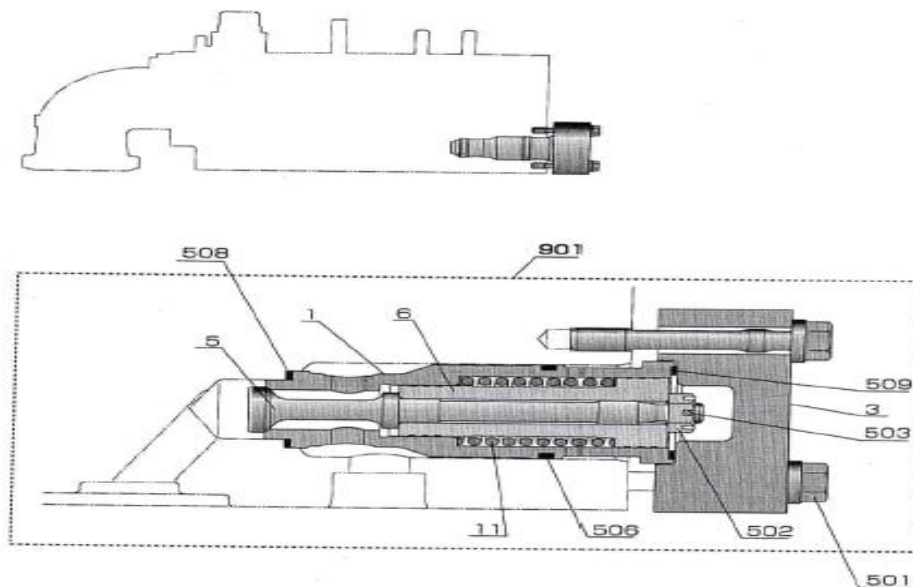
- Communication equipment, containing marine radios (VHF, HF, UHF), intercom, public address, and satellite communications systems, as well as emergency communication devices.
- Deck machinery equipment, such as provision cranes, general cranes, cargo handling equipment for the tankers and not only, hatch covers only for the bulk carriers, container fittings and lashing equipment for the container vessels etc. Additionally, there are the deck lighting and electrical equipment including deck floodlights, navigation lights, searchlights, electrical control equipment, various cable reels and extensions.
- Accommodation and galley equipment
- Hull equipment, such as the cathodic protection system, hull anodes etc.

In continuation to the above analysis of the two main compartments, it is of great importance to mention the recognition of the correct spare part needed. This process might be complicated if vessel manuals and drawings are missing. Every item has a part number, a drawing number and a position number, in some cases, it contains a description, with specifications and details.

For instance, the following figure is an example page of a drawing from the makers manual, more specifically a starting valve from the engine compartment category of spares, that belongs to the auxiliary engine type 6DK-20e, the maker of which is Daihatsu, from the third chapter, the item number 18. Additionally, noticeable are other

items as well and the number of each item that compose the starting valve.

CHAPTER	3	起動弁 STARTING VALVE
ITEM	18	



6-8DK-20e Z 10-10

DAIHATSU

Ⓐ Ⓒ

2.5.1.1 ORIGIN OF SPARE PARTS

To better understand marine spare parts and the need for cooperation between the purchasing and the technical department, it is vital mentioning the three origin types of spare parts, more specifically the genuine parts, the original equipment manufacturer parts better known as OEM, and the equivalent parts.

The term “genuine” spare parts refers to components or equipment that are original and authentic, specifically designed and manufactured by makers. These parts are produced to meet the exact specifications and quality standards set by the manufacturer of the equipment and are intended to ensure optimal performance, reliability, and compatibility with the specific marine equipment they are designed for. Even when we are referring to the term of “genuine”, we need to understand that the parts are not exactly provided from the original maker, but in the most circumstances from sub-

contractor of the maker.⁷ By choosing genuine spare parts, it means less risk regarding the suitability issues and cycle of life of the item, but still in most cases it is not the most cost-effective choice. Certificates of originality and extended warranty is provided by the maker is important and influences the final decision before proceeding with purchase.

On the other hand, the term “OEM” refers to components or equipment that are developed and constructed by different manufacturers and not the maker. Sometimes the OEM parts might come from original source, sub-contractor of maker. OEMs have in-house manufacturing facilities and produce spare parts for their own equipment. These parts are considered as replacements for the original components that came with the equipment. OEM spare parts are designed to fit and function as the original parts, and in some cases may be the only way for an updated version of an obsolete spare part. In most cases OEM spare parts are more cost-effective in comparison to genuine.

It is worth noting that one more origin of spare parts has become famous the past years, and this is no other than the “replacement or equivalent” parts. The key characteristic of equivalent parts is their ability to replicate the form, fit, and function of the original parts. These parts may be manufactured by various suppliers even with no certification at all. It is important to note that replacement parts focus on providing suitable alternatives that try to meet the technical requirements and performance specifications of the original parts. The sourcing of replacement parts involves considering factors such as availability, quality, compatibility, and cost-effectiveness.

2.5.1.2 CONDITION OF SPARE PARTS

Knowing the condition of spares is important as well, distinctively brand-new spares or second-hand spares.

Brand-new condition refers to spares completely new and have never been used before. These parts are typically sourced directly from the original maker or authorized suppliers. Brand-new spare parts come with the assurance of quality, reliability, and compatibility with the specific marine equipment they are designed for and are often

⁷ Goh, D. (2022) “Understanding the 3 Types of Marine Spare Parts,” Marine Engineering and Repair Singapore

preferred for critical components or when there is a need for maximum reliability and performance.

On the contrary, second-hand spare parts, also known as used or reconditioned parts, are spare parts that have been previously used on marine equipment but have undergone a process of refurbishment or reconditioning to restore their functionality and extend their service life. These parts are typically obtained from decommissioned vessels, salvage operations, or equipment refurbishment companies. Second-hand spare parts can offer cost and time savings compared to brand-new parts and may be suitable for non-critical components or when cost and delivery time considerations are a priority.

When sourcing second-hand marine spare parts, it is important to ensure they are sourced from reputable suppliers, undergo proper testing and inspection, and meet the required quality standards. Depending on the condition and age of the part, it may come with limitations in terms of warranty, compatibility, and availability. Careful evaluation and consideration of factors such as reliability, availability, cost-effectiveness, and the specific needs of the vessel are important when deciding between brand-new and second-hand marine spare parts.

2.5.2 LUBRICANTS, OILS, GREASES, PAINTS AND COATINGS

Another important category of goods that are purchased by the purchasing department is the lubricants, oils, greases, paints and coatings that the vessel requires, the subcategories of which will be analyzed.

Regarding the lubricants, the main categories are:

- Engine oil, which is used for lubricating the engines, including both two-stroke and four-stroke engines.
- Gear oil, for lubricating gearboxes and transmissions.
- Hydraulic oils, for hydraulic systems, such as the steering system and propeller, it is worth mentioning that in some countries strict regulations apply, where it is mandatory using Environmentally Acceptable Lubricants (EALs) in equipment with oil-to-sea interference, in this case the propeller.
- Turbine oil for lubricating steam turbines and gas turbines.

- Compressor oil, for lubricating air compressors and refrigeration compressors.
- Cylinder oil, for lubricating the cylinders of two-stroke engines.
- Refrigeration oil, for lubricating refrigeration systems.
- Wire rope lubricants, for wire ropes on cranes and winches.
- Open gear lubricant, for open gears, such as those found in anchor windlasses and cranes.

Regarding greases, the main categories are:

- General purpose grease, for various applications, such as bearings, hinges, and fittings.
- High-temperature grease, for applications where high temperatures are encountered, such as the exhaust system.
- Water-resistant grease, for applications to equipment exposed to water, such as deck equipment and thruster systems.
- Synthetic grease, for applications that require high performance and extended lubrication intervals.

As for paints and coatings, the main categories are:

- Antifouling paint, which applies to the hull to prevent the growth of marine organisms and reduce drag.
- Primers, also applied to the hull as a base coat before applying the final paint layer.
- Topcoats, these are applied as the final layer for aesthetic purposes and to protect against UV rays, corrosion, and weathering.
- Epoxy coatings, used for corrosion protection on steel structures, tanks, and decks.
- Non-skid coatings, applied to decks and walkways to provide slip resistance.
- Heat-resistant coatings, used in areas exposed to high temperatures, such as exhaust systems and engine rooms.
- Zinc-rich coatings, used for galvanic corrosion protection on metal surfaces.
- Marine enamel, which is a durable paint used for various surfaces, including machinery and equipment.

It's important to punctuate that specific types and brands of lubricants, greases, and paints used on a vessel may vary depending on factors such as the vessel's type, operating conditions, and regulatory requirements. Manufacturers or suppliers may also recommend specific products for particular applications.

2.5.3 *STORES AND PROVISIONS*

Stores and provisions cover a wide range of essential items needed for the operation, safety, maintenance, and comfort of a seagoing vessel. Ships need to maintain an adequate inventory of these stores and provisions to ensure smooth operations and the well-being of the crew. The specific items and quantities required may vary based on the size and type of vessel, trading area, and crew complement. Additionally, regulations and industry standards may dictate certain provisions and safety equipment that is mandatory to be carried on board.

Important to mention the three-month supply or quarterly supply that refers to the inventory of essential provisions and resources that are intended to sustain the crew and operations onboard for a period of three months. These supplies are vital for the vessel's functioning and the well-being of its crew during extended periods at sea or in remote locations where resupply may not be readily available. Vessel's crew requires an adequate and balanced diet, medical supplies, and personal care items to maintain their physical health and mental well-being during their time onboard. A three-month supply ensures that the crew has access to nutritious food, fresh water, medical treatments, and necessary hygiene products, reducing the risk of nutritional deficiencies, illnesses, and discomfort that could adversely affect their performance and morale. Additionally, in maritime operations, unforeseen circumstances such as equipment failures, medical emergencies, or even natural disasters can arise. A three-month supply ensures that the vessel is adequately prepared to handle emergencies and can provide immediate support to the crew. Having essential resources readily available onboard reduces dependence on external assistance and enhances the vessel's ability to respond effectively in critical situations.

Moreover, international regulations and conventions, such as the International Convention for the Safety of Life at Sea (SOLAS) and the International Safety Management (ISM) Code, mandate that vessels maintain a sufficient supply of

provisions and resources to sustain the crew for long periods. These regulations aim to safeguard the well-being of seafarers, promote operational safety, and ensure vessels are adequately prepared for emergencies or unforeseen contingencies as already mentioned.

The main categories of stores and provisions that a ship typically needs can include the following:

- Deck stores, such as ropes and lines, mooring and towing equipment, safety nets and barriers, cargo securing equipment lashing materials, chains, etc. Life-saving appliances these being lifebuoys and life rafts, firefighting equipment, fire extinguishers, hoses, etc. Navigation lights and signaling devices.
- Engine stores, these being filters for oil, fuel and air, belts, hoses, and gaskets, tools and equipment for engine maintenance and repair and engine control systems and instrumentation.
- Electrical stores, batteries and chargers, various cables and connectors, lighting fixtures and bulbs, switches, fuses, and circuit breakers, secondary navigation and communication equipment and power distribution panels and control systems as well.
- Cabin stores, for instance bedding, linens, towels and toiletries, galley equipment cleaning supplies and detergents, furniture and furnishings, safety equipment such as life jackets, fire blankets, etc. and entertainment systems.
- Provisions that consist of food and beverages including fresh, frozen, and canned items, potable water and drinks, dry goods such as flour, rice, pasta, condiments, spices, seasonings, snacks, desserts as well as cleaning and sanitary supplies.
- Medical stores, including medications and pharmaceuticals, first aid kits and supplies, various medical equipment and instruments that are needed, oxygen cylinders, resuscitation devices, medical books and reference materials.
- Tools for all type of purposes such as hand tools screwdrivers, wrenches, power tools, drills, saws. Various welding, cutting and calibration equipment.

- Bonded stores encompass a wide range of items, typically divided into different categories based on their intended usage and nature. These categories may include special food and beverages, mainly tobacco and alcohol.

- Safety stores, a wide array of provisions and equipment that are specifically intended to ensure the safety and security of the crew, passengers, and the vessel itself. These stores include personal protective equipment, life-saving appliances, fire-fighting equipment, navigational and communication devices, medical supplies, and emergency lighting and signaling devices. Compliance with international regulations and standards is essential to effectively manage and maintain safety stores on board ships.

- Navigational stores, such as nautical charts and publications, Global Positioning Systems (GPS) and navigation equipment and instruments, log books and digital maps.

2.5.4 *BUNKERS*

In the shipping industry, the term "bunkering" refers to the process of supplying fuel, typically marine fuel or bunkers, to a vessel. Bunkering involves the transfer of fuel from a fueling station or bunker barge to the ship's fuel tanks. Some companies have different department which is dedicated to bunkering, the manager of which might be the HSQE manager or the technical manager or even have its manager. It is of great importance the choice of vessel bunkers, not only because bad fuel might cause various damages to the engine but also for the voyage and the cost of it.

The process of bunkering is complicated and requires preparation, starting with the vessel's inquiry about bunkers, which is sent to the office, then the purchasing or bunkering department forwards it to various suppliers, to gather quotations. Usually there are bunkering suppliers that the company has worked with before and has positive or negative experience. The evaluation follows, the best offer under given circumstances in terms of quality, price and delivery is chosen, and the order is placed.

The vessel's crew or the bunkering agent communicates with the bunker supplier to arrange the bunkering operation, including the quantity and type of fuel required, then the vessel tanks are getting checked to ensure readiness for receipt of bunkers, while always following the safety protocols. If the bunkering is conducted via bunker

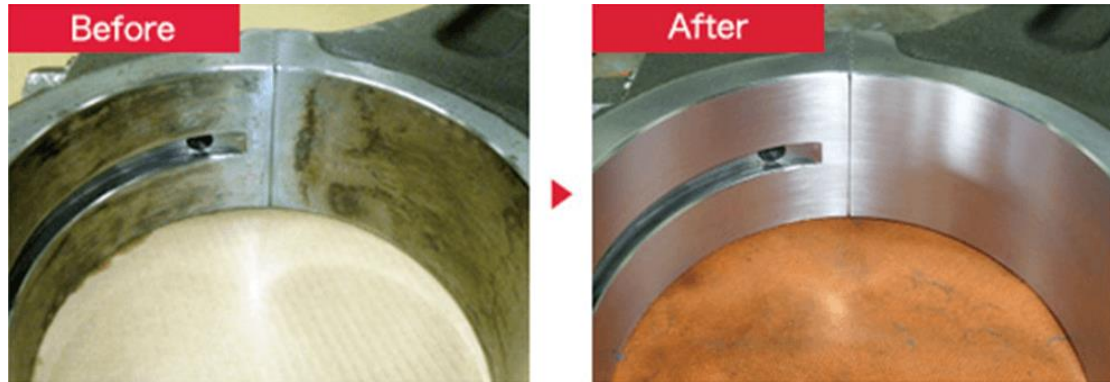
barge or tanker, a meeting location has been pre-arranged, and when the bunkering ship arrives, establishes communication with the vessel's crew. Subsequently, hoses are getting connected to the vessel, again following the safety procedures and bunkering starts. The supplier, after the end of the procedure, provides the bunkering delivery note which includes information such as fuel quantity, quality, supplier details, and other relevant data, the vessel verifies the details ensuring it matches the agreed-upon specifications and requirements. Once the bunkering procedure is finished, hoses are disconnected and all valves are getting checked and closed, to prevent any leakage, then a final inspection from both the vessel's crew and supplier's side is contacted ensuring the bunkering area is clean and free from any potential hazards. The final steps of the procedure follow, the bunkering delivery note or BDN is getting signed by both sides' representatives, fuel samples are kept and sent for checking and the vessel's crew updates the fuel records while maintaining the necessary documentation for regulatory compliance and accounting purposes. A copy of the BDN is provided to the office as well for operation closure and invoicing purposes.

2.6 SERVICES AND SPECIAL PROJECTS

The last category that the purchasing department is involved, is the services and various projects that has decided to implement, sometimes due to regulations and sometimes due to company's proactivity.

To begin with, many companies choose to refurbish or recondition spare parts that are valuable and would like to keep in good working order than just replace them. After technical inspection to crucial engine equipment such as piston crowns, piston skirts, crankshafts, fuel injection valves, etc. observations may occur, so to prevent damage or malfunction, the spares should be replaced with the remaining on board. Then the purchasing department, after receiving report, feedback, and guidance from the technical department and vessel's crew, sends inquiry with photographs and description to suppliers mentioning the next port that the vessel is calling, then receives offers and evaluates them. When it is time for the vessel arrival to the aforementioned port, the purchasing department along with the local agent has already arranged, on exchange basis, to off land spares to the agent or the supplier. The process continues and the spares are getting to suppliers' warehouse, where are again inspected and reconditioned, upon completion of reconditioning, files of further inspection and photographs are

provided to the purchasing department. Arrangements along with the supplier are to be made, so to forward the reconditioned spares back to the vessel, delivery note is provided, and the operation or project has been completed. Below following example, a big end from the connecting rod of an auxiliary engine before and after reconditioning.



Source: Yanmar Engineering, exchange and recondition

Dry docking is a significant event in the life cycle of a vessel, during which it is taken out of the water for inspection, maintenance, and repairs. It is worth mentioning that afloat repairs and services can be done too, depending on the vessel and its needs. Again, the purchasing department along with other departments such as technical, finance, operations and freight decide the best option available for the upcoming dry dock. The purchasing is in charge to gather offers from various shipyards, taking into consideration availability of it and the days that will be needed for the repairs. Preliminary work is done as well for the rest of goods that are needed.

The main vessel services that are required while on dry dock are the hull maintenance and repair, propulsion system overhaul and change of stern tube seals, any mechanical or electrical systems needed to be repaired or overhauled, such as the maneuvering system, the pneumatic system, etc. bottom treatment and anti-fouling, tank or hatch cleaning and inspection, interior refurbishments, safety equipment inspection and certification and final the survey and classification, meaning that classification societies conduct surveys and inspections to assess the vessel's compliance with rules and regulations. These include structural surveys, thickness measurements, load line inspections, and other tests to ensure the vessel's seaworthiness and compliance with classification standards. For all the above the main goal of the

purchasing department is to ensure smooth operation, cost-effective and best quality services, given the deadlines.

CHAPTER 3: CHALLENGES AND OPPORTUNITIES

3.1 THE IMPORTANT ROLE OF THE IMO

The International Maritime Organization (IMO) is a specialized agency of the United Nations responsible for regulating and promoting the safety, security, and environmental performance of international shipping. The pivotal role of the IMO is to create a regulatory framework that promotes safe, secure, and environmentally sustainable practices worldwide. By setting global standards and facilitating international cooperation, aims to ensure the smooth and efficient functioning of the maritime industry while safeguarding the marine environment and protecting the lives and interests of those involved in shipping.

In the past decades, IMO has taken some actions in order to protect the environment and make steps towards green shipping. More specifically in 2004, has been implemented the ballast water management convention also known as BWM convention, aimed to prevent the spread of harmful aquatic organisms and pathogens through ballast water, by setting standards for ballast water treatment and discharge to protect marine ecosystems. However, the convention entered into force on September 8, 2017, and ships are required to comply with the ballast water management standards outlined in the Convention, making it compulsory for ships to install a ballast water treatment system. Such projects are again organized by both the technical and the purchasing department, acting in concert, sourcing offers for both the spare parts and services needed, evaluating and proceeding with orders.

In 2020, IMO implemented a Sulphur cap regulation that limits the Sulphur content in fuel oil used onboard ships, reduced from the previous limit of 3.50%, to a maximum allowed of 0.50%. This regulation aimed to reduce Sulphur oxide emissions and improve air quality and for the companies to comply ships must use low-Sulphur fuel oils or alternative fuels, such as liquified natural gas (LNG), ammonia, methanol, ethanol, etc.⁸ or install exhaust gas cleaning systems, better known as scrubbers. The

⁸ Van, T.C. et al. (2019) "Global impacts of recent IMO regulations on marine fuel oil refining processes and ship emissions"

retrofit of the scrubbers is a costly and time-consuming project, which again handled by the purchasing and the technical department together.

Furthermore, there has been heated discussion regarding the Energy Efficiency Design Index (EEDI) and Ship Energy Efficiency Management Plan (SEEMP) as well. Specifically, the EEDI requires newly built ships to meet certain energy efficiency standards based on their type and size, while the SEEMP establishes a framework for ship operators to improve the energy efficiency of their existing fleet through various measures, such as voyage planning, optimization of engine performance, and hull maintenance. Again, various suppliers and engine makers have developed patents and systems that monitor and limit engines' revolutions and torque, from mechanical to electrical solutions, to comply. This measure has once again affected the role of the purchasing department, guided by the technical department, inquiring for such systems and appointing meetings and presentations to ensure the best matching method, as there is plethora of options.

To summarize, mentioned are just a few examples of the regulations implemented by the IMO in the past year. Essentially, IMO continually works on developing and updating regulations to address environmental protection, safety, and security issues in the shipping industry, thus the purchasing department should always stay up to date to the latest regulations, by doing continuous research on sources and possible suppliers aligning with the company's values.

3.2 INVENTORY OF HAZARDOUS MATERIALS

Regarding the maritime industry, the Inventory of Hazardous Materials (IHM) is a document that identifies and provides detailed information about the hazardous materials present on board a vessel. It is a requirement under the International Convention for the Safe and Environmentally Sound Recycling of Ships (Hong Kong Convention). The IHM lists all hazardous materials used in the construction and equipment of the ship, including substances such as asbestos, PCBs (polychlorinated biphenyls), lead-based paints, ozone-depleting substances, and other hazardous chemicals. The purpose of the IHM is to ensure proper management and disposal of these materials during the ship's operational life and especially during the ship's recycling or dismantling phase. The form includes information such as the type of hazardous material, quantity, location on the ship, and any specific handling or disposal

instructions. It helps ship owners, operators, and recycling facilities to effectively manage the safe handling and disposal of hazardous materials and comply with environmental regulations.

The purchasing department of each company, after placing order for any kind of items, spare parts, tools, and equipment is requesting from the supplier the Material Declaration form (MD) and the Suppliers Declaration of Conformity (SDoC) form, that guarantees that goods to be supplied are complying with the IHM rules. More specifically MD form is used by suppliers or manufacturers of equipment, components, and materials to declare the presence or absence of hazardous substances in their products. It provides detailed information about the chemical composition, substances of concern, and compliance with relevant regulations or standards. While SDoC form is used by suppliers or manufacturers to declare that the supplied equipment, components, or materials comply with applicable regulations and requirements, including restrictions on hazardous materials. It confirms that the products meet the specified standards and do not contain any prohibited or restricted substances. The vessel should keep these files for every order and update them, this work is mainly done by the purchasing department and the HSQE.

3.3 THE PANDEMIC

At the end of the 2019 humanity faced something unusual, something that could not have been predicted, the pandemic of COVID-19. The daily operation of all the companies around the world has been strongly affected. As we have already mentioned, maritime cluster is worldwide and it has volatility as the main characteristic, thus all of the departments in shipping companies have faced various challenges. More specifically the purchasing department had to deal with various issues from the difficult of the transportation of goods, to shortages and long delivery times.

The pandemic disrupted global supply chains, causing shortages, delays, and interruptions in the availability of goods and services. The purchasing department had to quickly adapt and find alternative suppliers or substitute products to maintain operations and meet company's demands. This led to increased demand for essential goods such as medical supplies, personal protective equipment, and pharmaceuticals. The purchasing department had to navigate the scarcity of these items, negotiate with

suppliers for fair pricing, and ensure a steady supply to support the vessel's operation and the needs of the crew.

COVID-19 highlighted the importance of supplier risk management. Many suppliers faced financial difficulties, production shutdowns, or logistical challenges due to lockdown measures and restrictions. Thus, the purchasing department had to assess supplier stability, diversify the supplier base, and establish contingency plans to mitigate the risks associated with supplier disruptions.⁹ That also led to unusual price volatility and fluctuations in raw material costs, transportation costs, and currency exchange rates. To tackle these problems, the purchasing department had to closely monitor market conditions, negotiate favorable contracts, and implement cost control measures to mitigate the financial impact and ensure the company's profitability.

Nonetheless, the pandemic also played a crucial role to technological advancement and forced quick adaptation to the current reality. The rapid improvement of technology introduced both opportunities and challenges for the purchasing department. While new tools and software can streamline procurement processes, they also require adaptation and training. Stay abreast of technological advancements and evaluate their potential benefits and implementation challenges, are the goals of the department. Fortunately, a lot of web platforms and Enterprise Resource Planning (ERP) systems regarding the purchasing process have become well-known during and after the outbreak of the pandemic, making the process easier and aiding in timesaving.

3.4 THE SIGNIFICANCE OF E.R.P.s ON THE PURCHASING PROCEDURE

More specifically, Enterprise Resource Planning (ERPs) systems hold substantial significance within the purview of purchasing departments in shipping companies, exerting a multifaceted impact on operational efficiency, cost optimization, and strategic decision-making. This significance emanates from the inherent complexity of the shipping industry, characterized by intricate supply chains, dynamic market conditions, and regulatory intricacies. ERPs, as integrated software platforms, furnish a coherent framework to manage and streamline diverse purchasing functions, engendering improved resource utilization and enhanced organizational performance.

⁹ UNCTAD, Impact of the Covid-19 pandemic on trade and development: Lessons learned.

Primarily, ERPs empower purchasing departments through the consolidation and centralization of procurement-related processes. The amalgamation of procurement activities, encompassing requisition, vendor selection, order placement, and invoice processing, within a unified digital ecosystem fosters enhanced visibility and transparency. This transparency is pivotal in instilling accountability and ensuring adherence to established procurement protocols, minimizing the risk of unauthorized purchases, vendor deviations, and procedural incongruities.

Furthermore, ERPs facilitate real-time access to critical procurement data, bolstering data-driven decision-making. The ability to monitor inventory levels, vendor performance, lead times, and pricing trends enables data-informed choices regarding optimal procurement strategies. The integration of data analytics and reporting functionalities empowers purchasing professionals to discern patterns, forecast demand, and strategize inventory management, ultimately mitigating supply disruptions and inventory excesses.

Cost containment constitutes another critical facet of ERPs' impact on purchasing departments. ERPs enable rigorous cost tracking, expense monitoring, and budgetary control by providing a comprehensive view of expenditure across procurement processes. The automation of requisition-to-payment cycles and the incorporation of approval workflows within ERPs mitigate manual interventions and potential bottlenecks, enhancing process efficiency and curtailing administrative costs.

For example, platforms such as the well-known Danaos ERP, Shipperserv, Scorpio portal, DNV GL Portal, Procureship, etc. have become very popular, as not only a purchaser can receive various inquiries via vessel on a template but can also send these inquiries to many different suppliers, receiving via the same platform prices and availability, making it easier to compare and keeping records of prices per items. After gathering offers, the purchasing process continues by forwarding them to the Marine or Technical superintendent in charge, who can revert with amended amounts or quantities, with approval to proceed or even with rejection. Meanwhile, another important factor is that it keeps a record of orders and stock availability of items on board. Finally, after the placement of the order, the vessel or even the supplier can insert the proof of delivery or delivery note stamped and signed by the master of the vessel, thus aiding in proceeding with invoicing and operation closure of each case. The most

fascinating part of the above is that the purchaser and the rest of the shore-based team can work remotely and reduce time spent on evaluation and other procedures, departments such as the vetting can have access to the status of each case, and as we are already mentioned, depending on the vessels type of cargo, time is very important.

ERPs stand as a pivotal cornerstone in augmenting the efficacy of purchasing departments within shipping companies. Their ability to centralize, streamline, and optimize procurement activities, coupled with data-driven decision-making and strategic supplier collaboration, collectively contribute to fostering operational excellence and sustained competitive advantage in the intricate domain of the shipping industry. As digitalization continues to reshape the maritime sector, the judicious deployment of ERPs remains instrumental in propelling procurement functions toward higher echelons of efficiency and effectiveness.

3.5 BUDGETING

The process of creating and managing a financial plan that forecasts income and expenses for a time period is known as budgeting. Budgeting is a crucial ability for business owners, executives, and managers to ensure that teams and organizations have the resources to carry out initiatives and achieve goals. Projected income and expenses for a specific time period (such as the following quarter, half, or year) make up a basic budget. In order to avoid overspending, expenses should be deducted from predicted income before any remaining funds are distributed to projects and initiatives. To see how closely predictions matched actual spending, past periods' budgets can be compared to the company's actual financial allocation and performance.¹⁰

As far as shipping companies concerns, budget is pivotal for taking the right decisions, it exists for every owned and or managed vessel and each expense category separately. Same is prepared by the relevant departments, following a request of the cost control manager before year-end. The cost control manager in co-operation with the Top Management and the accounts department are responsible for defining the deadlines of budget preparation. It is pivotal for each vessel to be set according to where the vessel is scheduled to travel, the age of the ship, the type of vessel and the current status of it. Some categories of budgeting have already been mentioned and include the

¹⁰ C. Cote, Harvard Business School (2022) “Why is budgeting important in business? 5 reasons.”

goods a vessel needs for safe and smooth operation, the crew wages and welfare funds, insurance, repairs and maintenance, stores, spares, lubricants and miscellaneous expenses, not including the capital costs and voyage costs. The draft budget for each vessel is discussed between the cost control manager, crew manager, technical manager, purchasing manager and all other department managers for their respective budget items and costs. Following the above procedure, the Top Management makes possible amendments and signs the annual budget in order same to be submitted to the Vessels' Owners, in case the company owning the vessels and managing the vessels are not the same.

CHAPTER 4: RECOMMENDATIONS AND FUTURE OUTLOOK

4.1 MANAGEMENT REVIEW MEETINGS

The Management Review Meetings are extremely important to any company but in our specific case, a shipping company's operational environment. It acts as a key mechanism for a number of vital processes that are essential to the development and success of the business. Key executives and decision-makers from the top management assemble for the Management Review Meeting (MRM), a planned and recurring event, to assess the effectiveness of many parts of the business' operations. MRMs serve as a forum for evaluating the overall health of the business, analyzing progress made toward strategic goals, and making choices that would encourage improvement and compliance. These are often held at set intervals, such as quarterly or yearly. However, if these meetings occurred more often but for less hours, for example once or twice a week for one or two hours, this would help each department build better relationship with other, while understanding issues and contributing to resolve or avoid re-occurrence.

Due to the high volatility that accompanies the shipping industry, in case of MRMs would be planned on weekly basis this would help with daily and weekly settlement of goals, while ensuring that the organization remains focused on its mission and long-term vision, because these gatherings make it easier to identify and evaluate potential hazards, allowing for proactive risk mitigation measures. Important to not as well, that by assessing key performance indicators (KPIs), financial measures, and operational standards, with the help of weekly reports from each department, these meetings enable systematic performance assessment and data-driven analysis of business performance.

Efficiency is of great importance in shipping, and management reviews identify operational bottlenecks, process inefficiencies, and resource allocation challenges, facilitating streamlining efforts while ensure compliance with international and local regulations, with discussions on environmental, safety, and security standards to develop strategies for ongoing voyages.

All the above would assist, not only to build better relationship between each department, but also to improve daily and weekly task planning, understanding company's short-term and long-term goals and identifying whether improvements and actions could be made.

4.2 CONTRACTING

Another important factor that affects the whole company and the purchasing department are the contracts, which are special agreements with certified suppliers that provide more competitive prices than usual to customers, in this case the shipping companies, under specific terms and affect the purchasing process in a positive way.

Contracts create a binding legal framework that outlines the rights, duties, and commitments of all parties participating in the procurement process. Contracts are crucial tools for risk reduction in the setting of a shipping company. They guarantee that agreements are upheld, and disputes may be settled legally. There are various factors choosing to provide a contract agreement between two or even more parties. For the shipping companies to come to an agreement is even more complicated as many different departments are in charge for such purpose, these being the legal and the purchasing and then the department that the products or services range of supplier concerns to, for example if an agreement is about to be made with a supplier of chemical products, the technical manager is mandatory to attend it, if an agent proposes a contract for their agency, then the operations manager and the disbursements manager must attend, or if a supplier of mooring equipment is proposing for a contract then the head of the marine and or operations department must be there as well.

Contracting is an important tool that can help minimize risk and cost reduction, while building trustworthy relationships with suppliers that would affect positively both of the parties, while ensuring safe and smooth procure of the ship. More and more companies are implementing this tool, but still there are companies that does not pursue

this tool, which nowadays with the assistance of technology may only contribute in a positive manner to the shipping companies.

4.3 TECHNOLOGY INTEGRATION

Invest in procurement technologies such as Procure-to-Pay (P2P) systems, e-procurement tools, and Supplier Relationship Management (SRM) software to streamline processes and enhance data-driven decision-making.

Leverage data analytics and Artificial Intelligence (AI) for predictive procurement, demand forecasting, and spend analysis.

4.4 INTERNAL SEMINARS

Internal seminars are used to describe seminars held within a company for training and development. These company-sponsored seminars are often created and hosted at the company's offices with the aim of transferring knowledge, abilities, and expertise to staff members or particular organizational groups. They are an important resource for the workforce of the company's professional growth, knowledge transfer, and skill development.

More specifically as we have already mentioned, it is of great importance for a shipping company and its purchasing department to build trustworthy relationships with their suppliers. Seminars that are conducted by suppliers referring to their products and services, may result in a better understanding of the company's goals. When trained right, purchasers can improve their efficiency and effectiveness, reducing risks and possibilities of errors, while boosting understanding of the process. The aforementioned may also result in reduced costs, which is one of the most important goals of the purchasing department.

Investing in training programs and skill development for procurement personnel, and keeping them updated on industry best practices, negotiation techniques, and procurement tools and technologies is a key factor for the growth of a shipping company, that will result in less operational expenses and better profit overall.

CHAPTER 5: CONCLUSION

In conclusion, this master's thesis has illuminated the pivotal role that the purchasing department performs within shipping companies and has underscored the transformative potential of technology in revolutionizing its operations by examining existing reports and thesis and combining them with empirical research. The maritime industry operates within a dynamic and highly competitive global market, where the efficient and strategic management of procurement functions is critical for a company's survival and success.

Through an extensive review of academic literature and empirical insights, it has become evident that the purchasing department is not merely a transactional entity but a strategic powerhouse that influences an organization's competitiveness, cost control, risk management, and sustainability and it has vital impact on the operational expenses of each vessel. In the maritime sector, characterized by multifaceted complexities, global supply chains, and stringent regulatory frameworks, the purchasing department emerges as the linchpin that connects the organization not only with its vessels and their needs, but also with the suppliers and orchestrates the seamless flow of goods and services. In addition to the above, this study has illuminated the game-changing impact of technology on purchasing functions and processes within shipping companies. The advent of digitalization, data analytics, artificial intelligence, and e-procurement systems has ushered in a new era of efficiency, transparency, and strategic decision-making. These technologies have empowered procurement professionals to make data-driven decisions, optimize supplier relationships, enhance supply chain visibility, and mitigate risks effectively, aiming always for the opportunity of supplying the best possible products or services to the most convenient ports, while prioritizing needs and dealing with the tight schedules.

The synergy between the purchasing department and technology is unmistakable. Technology not only streamlines transactional processes but also equips procurement professionals with actionable insights, enabling them to negotiate better prices and contracts, manage compliance, and contribute to sustainability objectives. The integration of blockchain technology, for instance, ensures the immutability of contracts and supply chain data, enhancing security and transparency.

As we navigate an era of digital transformation, it is evident that shipping companies must embrace technology as an enabler rather than a disruptor. By harnessing the power of digital tools and analytics, purchasing departments can elevate their roles from cost centers to strategic partners, driving operational excellence, innovation, and resilience. The dynamic nature of the maritime industry demands an agile and forward-thinking approach, where all of its departments and technology serve as co-pilots in navigating the uncertain waters of global trade, tackling the volatility and day-to-day worldwide changes that may occur, in geopolitical, economic, environmental changes and many other factors that affect the maritime industry.

Although there is no available exact definition of the purchasing department in the maritime sector and its role and responsibilities, via this thesis we will conclusively try to provide an accurate synopsis of it. The role of the purchasing department within a shipping company is to communicate with the vessels, understand their needs in products and services, and make sure procuring them in the most cost-effective practices and at convenient ports, thus lowering the expenses. Officers of this department have to be communicative as they need to cooperate smoothly with both shore and offshore personnel and suppliers, building trustworthy relationships. Strategic-minded and ability to adapt, while sourcing new suppliers, and looking always for the most competitive prices are must-have skills for purchasers. Their most important goal is to provide the best possible solution for the most competitive price, meaning less operational expenses for the vessels.

In closing, the purchasing department is very important, cooperating with other departments, ensuring good communication, understanding of needs and correct and on-time supply of vessels, handling complex situations, and managing time are its main duties. Important is building relationships with suppliers, while focusing on training and gaining advantages via technology and tools that have been implemented, while keep on training. The purchasing department, can one say is the unsung hero within shipping companies, playing a pivotal role in shaping their success and sustainability. The future belongs to those who harness the transformative power of technology to revolutionize procurement practices and steer their organizations toward prosperity in an increasingly digital world.

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