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Transformation of Makassar Container Terminal to Improve Loading and Unloading Affecting Logistics Costs

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Abstract. The container terminal is essential in marine logistics as the connection between sea and land. The acceleration of economic globalization and regional economic integration leads to a substantial rise in commerce. This study aims to determine the process and impact of the Makassar container terminal transformation and what obstacles hinder the smoothness of the transformation process in the Container of PT. Pelindo Regional IV Makassar Branch. This study used qualitative research through direct observation of the Object being investigated or directly witnessing the actual situation, as well as interviews with PT Pelindo IV Makassar Branch employees. The study results show that 1) Transformation in the Makassar container terminal is a strategic step to increase ports' efficiency, capacity, and competitiveness in eastern Indonesia. With advanced technology, operational optimization, and government policy support, this terminal can improve loading and unloading performance, reduce logistics costs, and support regional economic growth. 2) Several major obstacles were still found in the transformation process faced by the Makassar container terminal, consisting of a) Resource aspects, namely the standard of understanding that is not yet qualified and the readiness of human resources is not 100% to support the transformation program; b) business processes, still need improvement in SOP, PNC, GATE, Yard, Berth, Customer Service and Safety; c) Equipment and Facilities, some equipment is damaged so that it cannot be used optimally; d) Wavy field conditions; e) Layout and markings on the field are absent and f) Information and Technology (IT) system used did not fully support operational activities. It can be concluded that the transformation process continues to improve services for shipping companies, which are its main customers. The implication of the study is that service standards in the container terminal area are the company's main concern in providing optimal and efficient services.

Keywords: *Container Terminal; Loading;Logistics Cost;Transformation;Unloading*

INTRODUCTION

The container terminal is crucial in maritime logistics as the link between sea and land. The acceleration of economic globalization and regional economic integration results in a significant increase in trade (Yu et al., 2022; Chu et al., 2024; Mar-Ortiz et al., 2020). The efficient movement of containers and information within the terminal can be obstructed by various challenges, such as communication barriers between external and internal stakeholders, the coordination of internal logistics and container storage (Tsolakis et al., 2022), and the irregular arrival of trucks and containers, leading to truck queues and suboptimal utilization of terminal resources and facilities (Olesen et al., 2015).

The transformation of the Makassar New Port Container Terminal has shown significant improvements in loading and unloading efficiency, which has the potential to reduce logistics costs. In November 2023, the loading and unloading flow reached

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257,981 TEUs, exceeding the target of 193,287 TEUs. This increase was driven by operational standardization after the Pelindo merger on October 1, 2021, which included increasing productivity and service speed (Komalasari, 2023).

Moreover, the container terminal transformation as part of the Port of Makassar is a shipping center in the Eastern Indonesia region supported by the hinterland of South Sulawesi and West Sulawesi which has the potential for the logistics and transportation industry in Indonesia, especially in Makassar, has undergone significant changes with the adoption of the latest technology and management practices (Cristiyanti et al., 2022; Limbong, 2021). The geographical conditions of Indonesia, known as the Archipelago Nation, and the transformation of container terminals are among the main focuses, especially in efforts to increase the efficiency of loading and unloading time, which directly impacts national logistics costs (Idris et al., 2017; Stach et al., 2023).

Makassar Container Terminal is transforming changes from standard operating procedures using technology such as automation of loading and unloading processes and the application of the latest information systems, operating patterns with loading and unloading processes with sophisticated terminal management system facilities can provide real-time visibility of operations to improve loading and unloading performance (Rida, 2014). The effectiveness of loading and unloading performance can also be realized by being influenced by the role of human resources (HR), because increasing human resources can create efficient and sustainable performance (Gattuso & Cassone, 2018). Human resources are important and the main element because humans control other factors such as technology, facilities, and finance (Yang et al., 2023; Sasabone et al., 2023; Limbong et al., 2024).

Makassar Container Terminal has a central role in improving loading and unloading performance, and its impact is not only limited to operational efficiency but also significantly affects, increasing the optimization of the loading and unloading process which includes the introduction of automation technology that can increase the speed and accuracy of transportation infrastructure in the National logistics system can improve loading and unloading performance which has an impact on logistics costs, the movement of goods flow effectively and efficiently (Azisah et al., 2023; Djamaluddin & Rachman, 2024).

The condition of the port in Makassar, which is related to container loading and unloading activities, still needs to be improved from the operational pattern supported by reliable human resources (HR) and the implementation of digitalization in business processes and services (Boström &

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Österman, 2017). Therefore, efforts need to be made to improve equipment and services at the Port of Makassar to support the national logistics system, which impacts logistics costs (Souravlias et al., 2020). The transformation at Makassar Container Terminal has currently experienced a transformation in the productivity of loading and unloading at the highest Makassar Container Terminal of 30 Boxes/Crane/Hour(B/C/H) and 40 Boxes/Ship/Hour(B/S/H). Accessibility of sea transportation is measured in the availability of port nodes, operational patterns with standard operating procedures are still not in accordance with the reality in the field.

Transformation is a process of transition from a certain period to the next period that occurs due to innovation or changes in structure or procedures, planned or unplanned (Gharehgozli et al., 2020; Jumriani & Rosliawati, 2023). ECDIS is a new technology for modern navigation of shipping that aims to ensure navigation safety and improve work efficiency. The ship collision avoidance system is one of the important research subjects in modern navigation technology in preventing ship collision accidents in order to ensure safety, so ship navigation plays a very important role (Kajuna, 2024). This transformation includes reframing, restructuring, restructuring development priorities/revitalization, and renewal. According to its development, there are two reasons why humans process data and information, namely the first is because of human natural drive. Second administrative surveys on ownership.

Container terminals are located in the port area, at the meeting point of land and sea transportation (Tsertou et al., 2016), where ship loading and unloading activities, cargo storage, receiving and delivery of container cargo are carried out (Anwar, 2019). Therefore, the terminal requires the most appropriate handling facilities for fast and efficient cargo transfer, which is the main purpose of containerization. Makassar Container Terminal (TPM) is one of the branches of PT Pelabuhan Indonesia (Persero) for port service users, especially container services.

Makassar Container Terminal was declared in an effort to handle container service activities along with the increasing development of containerization through the port of Makassar at present and in the future. The services provided by the Makassar container terminal are oriented towards cost efficiency, time effectiveness, customer satisfaction, and support for the smooth distribution of national logistics, which are stated in the company's vision and mission in facing global competition (Tsolakis et al., 2022). The process of container port transformation, which, of course, wants changes for the better, requires careful

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planning. Using information technology, a company can save operational costs, increase employee efficiency, speed up time, increase production volume, and increase competitiveness with competitors.

The loading and unloading activities are as follows: Loading and unloading activities are activities to move goods from land transportation and to carry out the transfer of the load (Kim et al., 2021; Abu Aisha et al., 2020). Based on the definition that has been described above, loading and unloading is a process of loading and unloading by moving cargo from land to ship or from ship to land, which is carried or transported to the destination safely and the place is carried out according to procedures at the port by the ship's crew and land parties with existing loading and unloading equipment, either from the ship itself or from land (Gharehgozli et al., 2023).

Container loading and unloading equipment, as part of the container loading and unloading service from and to the ship, requires loading and unloading equipment that is capable of handling these activities, namely container cranes, transtainers, stacker reach trucks, forklifts, end trucks, and side or top loaders (Roy, 2018). A container stacking yard is a "Consolidation" place for loading or unloading containers onto ships (Neagoe et al., 2018). The container yard is specially designed with a structured system arranged with blocks, rows, slots, and tiers. Function of Container Yard (CY) or Warehouse Stacking Yard.

Logistics is a series of goods movement activities, starting from suppliers to end consumers, under the distribution channel system. In logistics activities, there is a flow of goods movement, information flow, and financial flow (Wang et al., 2023). Each activity requires supporting infrastructure and facilities, such as ports, highways, warehouses, railways, transportation equipment, and material handling equipment (Neagoe et al., 2018); (Bharadwaj, 2020). Logistics is a series of goods movement activities, starting from suppliers to end consumers, per the distribution channel system (Haralambides, 2019). In logistics activities, there is a flow of goods movement, information flow, and financial flow (Ha et al., 2019).

The gap of study: there is a general awareness that port efficiency impacts economic growth, but studies specifically linking the transformation to measurable economic outcomes in Eastern Indonesia remain limited. While it's generally accepted that port efficiency reduces logistics costs, studies quantifying these cost savings over the long term at the Makassar terminal are limited.

One of the causes of high logistics costs in Indonesia is high logistics costs at ports. Indonesia has not maximized transportation by sea, so the sea transportation system is less

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noticeable, including from the infrastructure. Logistics activities are carried out to accelerate goods from the sender's location to the recipient's location, using the most effective and efficient methods and costs. Logistics costs in Indonesia are triggered by a logistics system and infrastructure that are still not optimal (Djamaluddin & Rachman, 2024). Various factors cause the high cost of logistics: 1) A logistics system that is not yet good due to a lack of human resources; 2) The amount of supply of goods that is still not evenly distributed, so that there is a difference in logistics costs between the western and eastern parts of Indonesia; 3) A two-way system that often does not occur, ships transporting to the region should bring back cargo from the region to be more efficient.

The urgency of this study is clear: transforming the Makassar Container Terminal is necessary to ensure regional economic growth, competitive positioning, and alignment with global standards. Addressing this now will not only reduce logistics costs but also support sustainable and resilient growth for years to come.

This study aims to determine the process and impact of the Makassar container terminal transformation and what obstacles hinder the smoothness of the transformation process in the Container of PT. Pelindo Regional IV Makassar Branch.

RESEARCH METHODS

The type of research conducted is qualitative research. This study aims to identify and analyze the obstacles in the transformation process of the Makassar container terminal that impact improving loading and unloading performance and logistics costs. To achieve this goal, qualitative data analysis will be carried out with a case study approach, data source sampling will be carried out purposively, and snowball sampling will be used (Taylor et al., 2016; Richards & Hemphill, 2018).

In this research, the authors determined the number of respondents by selecting the random sampling method, which is the simplest and easiest method of data collection. This research was conducted at the Makassar Container Terminal. In this study, primary data comes from the research location based on interviews, namely primary data collection activities that come directly from research respondents at the Makassar Container Terminal. Secondary data is data obtained from literature related to the Object of study in the form of books, journals, written documents, operational rules, and other data (Elliott, 2018; Šuvaković, 2011; Esubalew Aman Mezmir, 2020). To discuss this problem, the author uses the following data sources: Respondents in this study were conducted purposively, namely the Makassar Container Terminal Management. Regulations, legal documents, agreements,

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operational rules, books, documents, dictionaries, encyclopedias, magazines, newspapers and so on related to the problems to be discussed in this study.

This study's data collection technique was carried out in several ways, namely through interviews (Taylor et al., 2016; Ramadhan et al., 2022). The author directly participated in interviews with various related parties, such as terminal management, loading and unloading operators, and logistics business actors. Activities carried out by PT Pelabuhan Indonesia (Persero) related to the transformation at the Makassar container terminal can improve loading and unloading performance, which impacts logistics costs. The instrument used in this technique is a statement of fact report.

The study will conduct direct observations in the field to observe the loading and unloading process, infrastructure conditions, and interactions between related parties. The analysis's results will be compiled into a comprehensive research report, including a description of the findings, discussions, and conclusions (Creswell, 2014; Boncz, 2015). Research related to documents, such as performance reports, standard operating procedures, and statistical data will be supplemented with data obtained from interviews and observations (Singh, 2006). This study is a method of collecting information, especially by focusing on books and notes related to the problem.

The data analysis method used is qualitative. Data analysis is the process of finding and compiling data obtained from interviews, direct notes, and documentation by organizing data into categories, describing them into units, synthesizing, compiling them into patterns, choosing what is important and what will be studied, and making conclusions (Denzin & Lincoln, 2018; Creswell & Creswell, 2007 Jalal et al., 2023; Sriwahyuni et al., 2022). so that they are easily understood by oneself and others namely 1) Extension of participation, this research is conducted long enough to get to know the respondents and the field conditions so that the presence of the researcher no longer influences the situation and has the full opportunity to collect and check all the necessary data. 2) Persistence: This researcher seeks consistency and interpretation in various ways related to the process of constant analysis. In the persistence of observation, the researcher tries to find characteristics and elements in the situation that are relevant to the problem and then focuses on them in detail. 3) Triangulation: in this triangulation, the researcher uses something else to check the validity of the data. The method used is by comparing it with other sources. The triangulation used is by using sources; here, the researcher makes comparisons and re-checks the degree of trust by comparing the observation data with the interview data. The

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second is by comparing what people say in public with what people say in private, and the third is by comparing the interview results with the contents of the documents that have been obtained.

DISCUSSION

Makassar New Port Container Loading and Unloading Equipment

Equipment in the container stacking process at a container terminal, namely *Quayside Gantry Crane*/ Container Crane (CC), at the Makassar New Port terminal, the number of container cranes owned is 6 units, each of which has 4 large main support pillars located at the edge of the pier which can only move horizontally in accordance with the existing rail lines. (2) Rubber Tyred Gantry Crane (RTG), the Makassar New Port terminal has 16 RTGs spread across each block in the Container Yard. Head Truck / Terminal Truck and Chassis, is a container transport trailer owned by the container terminal which functions to carry out haulage activities from the stacking yard to the dock and vice versa. Makassar New Port Terminal has 15 head trucks. (4) Reach Stacker: the Reach Stacker at Makassar New Port is used to lift or move containers either to the chassis or in the Container Yard.

Kinds of Equipment	Total
QCC	6
RTG Electric	16
Reach Stacker	2
Forklift	2
Terminal Tractor	15
Chassis 40 Feet	11
Chassis 45 Feet	4

Some of the Makassar Container loading and unloading equipment consists of 6 QCC units, 16 Electric RTG units, 2 Reach Stacker units, 2 Forklift units, 15 terminal tractor units, 11 40-foot Chassis units, and 4 45-foot Chassis units.

Container Stacking Yard

Container Yards or stacking yards become places to accommodate containers that will be unloaded or loaded on ships from the hinterland or other ports to be transported to their destination. The dwelling time at TPM for domestic containers is 6-7 days, while the dwelling time for international containers is 2.5 days.

Container Shipping Process For Shippers who wish to ship goods using containers, the owner of the goods must first enter into a written contract with the company PT. Pelindo Terminal Petikemas Makassar, regarding the cost of the goods carried, the owner must follow the following procedures: 1) The relation (shipper) comes to/contacts the company office. Next, go to CS (Customer Service) to fill in the SI (Shipping Instruction) which is needed for smooth delivery and to facilitate the creation of B/L (Bill Of Lading); 2) After the Shipper fills in the SI (Shipping Instruction) and returns it to the CS section, the CS Muat party issues a CRO (Container Release Order) related to the Container Seal which indicates that the Container Booking

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process has been completed; 3) The shipper brings the CRO (Container Release Order) to the operational section to carry out stuffing activities, by giving the CRO to the tallyman section to provide empty containers for stuffing, during the inspection of empty containers. 4) After the container check is complete, the owner of the goods prepares workers for stuffing until the container is full of goods with large capacity that cannot use a forklift first; 5) Take care of the Work Order at the shipping company office, then submit it to the operator section, to be stuffed with heavy equipment. After the stuffing process is complete, the container door is closed tightly and then sealed with the seal provided by the CS loading party; 6) Containers that have been stuffed have FTL (Full To Load) status, which indicates that the container is ready to be loaded onto the ship; 7) The operational party of PT. Pelindo Terminal Petikemas Makassar coordinates with the Pelabuhan Indonesia IV (Pelindo) Terminal Peti Kemas Makassar party which is the PBM party, for the activity of loading full containers onto the ship; 8) For containers that are already on board a ship or on their way to the destination port, the shipping company has made a manifest for the cargo.

Condition of Makassar Container Terminal Before Transformation

Several issues that occur at the Makassar Container Terminal can affect operational efficiency, logistics costs, and service quality. Some common issues are often faced: First, High Ship Waiting Time (Dwelling Time). In some periods, ship waiting time, or dwelling time has increased, especially if there is an imbalance between ship arrivals and loading and unloading capacity. Waiting too long can have an impact on delays in shipping goods and increasing logistics costs because the owner of the goods must bear additional costs due to delays in picking up containers.

Specifically, the issues that occur in the Container Terminal: 1) Operational patterns that are still based on Front Liner OPS so that they require Tally; 1) Performance / Operational Productivity is less than optimal, resulting in long Port Stays for ships; 3) Age of equipment that is relatively old and not optimal in operational readiness; 4) High operating costs and difficult to control and 5) Dissatisfaction from customers both Shipping Line, JPT (Forwarding) and Trucking due to the uncertainty of services at TPM. The issues reflect the challenges that Makassar Container Terminal needs to address to improve efficiency and competitiveness. Solutions involving increased infrastructure capacity, adoption of new technologies, improved logistics management, and collaboration between stakeholders can help resolve these issues.

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Makassar Container Terminal Transformation Process

Terminal operator PT Pelindo Terminal Petikemas (SPTP) is intensively transforming all of its work areas to improve services to its main customers, shipping companies. Service standards in the container terminal area are the company's main concern to provide optimal and efficient services.

There are 4 stages of container terminal transformation carried out by SPTP. In the first stage, the field is rearranged, basic needs for operational activities, and the condition and equipment needs of a terminal are. The second stage is standardizing skills and knowledge for operational workers. The third stage of container terminal transformation touches on the digitalization aspect of business processes. PT Pelindo Terminal Petikemas initiated the use of a single terminal operating system (TOS) in all terminals managed by the company. A single TOS has been implemented in TPK New Makassar and TPK Ambon. Gradually, this single TOS will be implemented in other container terminals under the management of SPTP. The fourth stage of our transformation has talked about the port ecosystem. Such as data exchange with stakeholders, shipping companies, goods owners, expeditions, and banking.

A maritime observer from Institut Teknologi Sepuluh, November Saut Gurning, welcomed the operation of container terminals in one sub-holding entity of PT Pelindo Terminal Petikemas. This will simplify the planning and coordination process so that each terminal is uniform. Standardization and similarity of business processes are one concern that the company must resolve immediately. We carry out standardization starting from improving the skills of operational human resources, operational patterns based on planning and control, and safety, to terminal facilities and equipment, while for systemization, we will equip container terminals with the same terminal operating system for all terminals in the SPTP environment.

Loading and Unloading Performance at Makassar Container Terminal

Several things related to the performance of the Makassar container terminal can be described, including the following: first, related to Ship Visits and Container Flow. The implementation of the direct call system and 24-hour service plays a major role in increasing the number of ship visits at the Makassar container terminal, in 2023, TPM management recorded around 1,537 container ship visits, it is very clear that there has been an increase in the number of ship visits from year to year, even in May 2024 it reached 586 container ship visits. Container flow tends to increase in shipping and receiving, but this can affect the performance of the stacking yard and the performance of lifting equipment at the

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Makassar container terminal; the cycle of goods flow for the last 5 years can be seen, reaching 717,883 in 2023 and 298,870 in May 2024.

Current Level of Pier Utilization. The level of pier utilization (Berth Occupancy Ratio/BOR), which is the comparison between the time of pier usage and the time available (pier ready for operation), the pier of the Soekarno Hatta Makassar port container terminal has a length of 850 m, with a pier type of wharf, a mooring capacity of 5 ships and is equipped with lifting equipment facilities on the side of the pier and access roads for vehicles in the form of other supporting lifting equipment, it is known that for operations in 2017 there were 1,544 ships that loaded and unloaded at the pier, the longest ship size served at the pier was 221.62m, and had a distance between ships of 20 m for large ships, the length of mooring time for each ship was 16 hours and the time available for 1 year was 8760 hours, while the BOR recommended by UNCTAD was 65%.

Level of Stacking Yard Utilization. The area of stacking yard currently available for TPK New Makassar (Terminal 1) is 126,400 M2 while TPK New Makassar (Terminal 2) is 108,114 M2. The YOR value is below the standard required by UNCTAD, which is 65 percent, as explained in the Decree of the Director General of Sea Transportation Number UM.002/38/18/DMT/11 concerning the operational service performance standards of ports, that the achievement value is declared good if it is below the standard of 65% of the operational performance standard value that has been set so that based on the calculation results, container terminal management only needs to maximize the existing stacking yard.

Last Performance of Container Terminal Loading and Unloading Equipment Loading and unloading equipment have a very important role in the smooth operation of the container terminal. Maximizing the function of the equipment requires knowing how much the loading and unloading equipment is capable of available loading at the Makassar container terminal at this time. It is known that the number of working days is 365 days, with working hours of 16 hours. Hence, the number of working hours is 5,840 hours/year, and some equipment that operates specifically at the container terminal is quai gantry Carena (GC), and rubber-tired gantry crane (RTG).

The transformation process at Makassar Container Terminal in improving loading and unloading performance has an impact on logistics costs, which can be divided into several important aspects, namely technology, operational management, time efficiency, and impact on logistics costs. Increasing the Use of Information Technology Systems and Digitalization at Container Terminals Implementation of automation systems such

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as Crane Automation, Terminal Operating System (TOS), and Yard Management System (YMS) allows for increased efficiency in container movement. Terminal Operating System (TOS): This system is used to manage loading and unloading activities, container arrangement in the yard, and ship scheduling. Crane automation makes the loading and unloading process faster and more accurate. This technology also reduces the risk of human error and increases operational safety.

In general, Makassar Container Terminal services are oriented towards several basic policies, namely cost efficiency, time effectiveness, and customer satisfaction, as contained in the company's vision and mission in facing the ever-changing world of global competition. Makassar container terminal through P/C based operating pattern, including: First, Berth Allocation Process. Berth Allocation is the process of scheduling ships to dock at a particular pier in the port, ensuring that ships can load and unload goods within a certain period. Second, the Ship Planner and Ship Talker are clear. Unlike before the transformation, many processes in P&C data were inaccurate, so planning could not run optimally. Third, Yard Planner & Yard Talker. Unlike before the transformation, the Preferred Area prepared by P&C was only based on Ships and usually lacked coordination with Operations, so the location of the container stack was different from the plan. Fourth, Deployment, Placement & Reporting Process. Unlike before the transformation, there was no Deployment Plan for the readiness & use of equipment, people, and work locations.

One of the main components of the transformation is the development of physical infrastructure at the terminal. This includes: First, increasing the capacity of the dock. Second, modernizing loading and unloading equipment. Makassar Container Terminal has upgraded its loading and unloading equipment by operating more modern and automated quay cranes, gantry cranes, and reach stackers. Third, expanding the container storage area. Container Yard: The Container Yard (CY) is a place for the “consolidation” of containers to be unloaded or loaded onto ships. The container yard is specially designed with a stacking system based on blocks, rows, slots, and layers.

This optimization activity includes several things, including the following: First, management of arrival and departure times of ships: A better scheduling system is implemented to reduce the queue of ships waiting at the port. Second, storage areas (yard management) should be rearranged. A more efficient yard management system can arrange containers based on destination and shipping priority. Third, Just-in-time operations. The application of the just-in-time principle at the port ensures that ships arrive and leave exactly on schedule so that

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no time is wasted and ships can be served optimally (Srisurin et al., 2022).

Human resource competency development is also a priority in the transformation process. This competency development is intended to build understanding and skills on P&C-based operating patterns through Training and sharing Sessions, which are the most important stages to ensure the smooth running of the Change Management Program. With the increasing capacity and efficiency of the Makassar Container Terminal, the economy in eastern Indonesia is expected to experience better growth. Makassar New Port is designed to be a major port and hub for ports in Eastern Indonesia, especially for export activities (Ashury et al., 2023). Previously, various mainstay products such as chocolate, coffee, and wood were exported via Tanjung Perak (Surabaya) or Tanjung Priok (Jakarta). The transformation at the Makassar Container Terminal has a direct impact on increasing efficiency in the loading and unloading process, which has an impact on 1) Reduction in dwelling time. Improved technology and better operational systems have reduced vessels' dwell time at ports, reducing ship and logistics operating costs; 2) Reduction in logistics costs: With more efficient processes, costs associated with container handling and distribution of goods can be reduced. This contributes to reducing total logistics costs, ultimately increasing product competitiveness in the market and 3) Increased throughput capacity. This transformation allows ports to handle larger container volumes without the need for major infrastructure additions, thereby increasing operational efficiency (Yu et al., 2022; Bhanot & Singh, 2014); Xu et al., 2021; Carlo et al., 2014).

The novelty in transforming the Makassar Container Terminal lies in integrating sustainable practices, smart technologies suited to mid-sized terminals, workforce inclusion, regional economic revitalization, and resilience—all within a user-centered, collaborative framework. This holistic approach could make it a pioneering model for similar ports worldwide, offering a fresh perspective on how ports in developing regions can modernize while enhancing socio-economic and environmental value.

In the Makassar Container Terminal Transformation process, several obstacles remain, including the following: First, the human resources aspect. There are two main obstacles: the standard of understanding that is not yet qualified and the readiness of human resources that are not 100% in supporting the transformation program being carried out. Second, the Business Process Aspect, transformation in container terminals, including the Makassar Container Terminal, often faces obstacles in various operational aspects, including improving Standard Operating Procedures (SOPs),

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Container Receipt and Departure (PNC), Gate, Yard, Berth, Customer Service, and Safety. Related to obstacles in improving SOPs (Standard Operating Procedures).

The transformation process to improve SOPs aims to increase efficiency and consistency in operations. However, sometimes obstacles are still often encountered, including Resistance to change. Employees or parties who are accustomed to old procedures may be reluctant to follow changes to SOPs. Third, the transformation obstacle is related to the layout and markings in the field that are not yet adequate at the Makassar Container Terminal. This can affect various operational aspects, such as efficiency, safety, and space management. The last Obstacle is Information and Technology (IT); the systems used do not fully support operational activities. When a company undergoes a transformation, the information systems used are often not optimal.

The implications of transforming the Makassar Container Terminal extend beyond mere operational efficiency, encompassing economic growth, environmental stewardship, technological advancement, and social progress. This comprehensive impact underscores the value of a well-planned, inclusive transformation that aligns with both local needs and global logistics trends.

The transformation of the Makassar Container Terminal provides strategic policy implications to improve connectivity, productivity, and sustainability of national logistics. With this transformation, the port can play a central role in reducing national logistics costs, boosting international competitiveness, and strengthening Indonesia's position in global trade.

CONCLUSION

The transformation that occurred at the Makassar Container Terminal through several factors influenced the transformation of loading and unloading performance at the Makassar Container Terminal, starting from improvements to Terminal Infrastructure, Automation Technology, Loading and Unloading Equipment, Operational Management, Manpower (HR), Information and Communication Systems, and Timeliness in improving technology, operational efficiency, and reducing loading and unloading time have a real positive impact on logistics costs. The main obstacles in the Transformation Process faced by the Makassar Container Terminal include 1) Resource Aspect, namely the standard of understanding that is not yet qualified and the readiness of Human Resources is not 100 percent to support the transformation program; 2) Business processes, still need improvement in SOP, PNC, GATE, Yard, Berth, Customer Service, and Safety; 3) Lack of Investment in technology; 4) Inadequate infrastructure, some equipment is damaged

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so that its use cannot be maximized; 4) Unreliable equipment; 5) Information and Technology (IT), the Information and Technology (IT) system used does not fully support operational activities; 6) unclear regulations and standards.

As for the recommendations of this research, Transformation at Makassar Container Terminal requires a comprehensive approach that includes optimizing improvements in terms of Infrastructure, Technology, Loading and Unloading Equipment, improving digital management, better space management, and improving HR skills, Information and Communication Systems and punctuality. lack of investment in technology, inadequate infrastructure, the need for better coordination between stakeholders, investment in modern technology, and development of skills and safety awareness of workers at Makassar Container Terminal. The next researcher can focus more on in-depth studies related to the application of digital technology, Furthermore, they can analyze more broadly how the performance of container terminals affects logistics efficiency in the supply chain in Eastern Indonesia.

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