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THE IMPACT OF TECHNOLOGY ON THE EFFICIENCY AND EFFECTIVENESS OF CONTAINER SERVICE IN TANJUNG PRIOK (STUDY ON PT. IPC TPK OF TANJUNG PRIOK)

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Abstract : This study presents a methodology for evaluating container terminal performance in terms of efficiency and effectiveness. An empirical research was conducted at the Tanjung Priok container port to assess its performance and illustrate the applicability of the suggested framework. A descriptive research method with a qualitative approach was used in this study. Because the goal of this research is to determine the impact of technology on the efficiency and effectiveness of container services in Tanjung Priok, professionals were asked to provide data not only on logistics, ports, and throughput, but also on daily logistics space, ports, efficiency, and effectiveness in harbor. Every year, there is a growth, indicating that container services using system technology have increased in speed and accuracy, as well as effectiveness and efficiency.

Keywords : Technology, Container, Efficiency, Effectiveness, Port of Tanjung Priok

Introduction

Container ports are critical to the global logistics chain's efficiency since they connect multiple kinds of transportation (Teng-Fei Wang, 2005). As a result, improving terminal efficiency is critical for any country's welfare (Esmer, 2008). Terminal efficiency is a leading indicator of terminal performance; efficient terminals result in lower transportation costs and make it easier for a country to import and export goods. As a result, inefficient terminals result in high freight and handling costs, which contribute to rising import and export prices. Improving the efficiency of container terminals is a high priority issue in any country; as a result, efficiency plays a vital influence in a container terminal's competitiveness (Almawsheki & Shah, 2015).

In order to ensure the efficient delivery of goods, enterprise benefits from two or more means of transportation to ensure efficient delivery of goods. The conveyance of commodities using at least two different modes of

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transportation is known as multimodal transportation. Multimodal transportation companies should work together more, have better and more current reloading equipment, and a new integrated technological system (Aprilianty & Evander, 2018)

There are currently a dozen or more combinations of automated cranes and automated transport vehicles, which were once limited to a small number of machine systems. With each new terminal development, new ideas, algorithms, and techniques are explored, advancing control systems and the hardware they live on. Multiple manufacturers are now actively engaged in research, development, invention, prototyping, testing, licensing, and delivery of new systems. Developers now have a variety of systems and providers to choose from, as well as sophisticated planning and analysis tools to help them make educated decisions.

However, access to information technology can have a positive impact on trade items only in nations where information technology users have sufficient skills. If the number of people using information technology isn't great enough, it won't have a major positive impact on the service industry (Nath & Liu, 2017). The importance of its service cannot be rejected or ignored by shipping businesses, because even their temporary storage service is quite vital. Basically, the port in Tanjung Priok is not controlled and operated using the same technology-based management information system as the rest of the country's ports. The port, which has a container terminal, provides the most comprehensive container logistics services. In this situation, the writer will attempt to break down in depth a concept of container terminal theory. The container terminal in the IPC Group is the one that will be discussed.

According to (Lasse, 2016), every company has an environment that can be divided into (1) the external environment or environment that is beyond control and is a factor of future influence, namely markets, competitors, regulations, suppliers, economic systems, technology and consumers or

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service users; and (2) the internal environment or organization that is fully under management control, namely production or service, employee capabilities, organizational structure, research and development, capacity and technology.

In order to make the research monitor easy, researchers propose of model below:

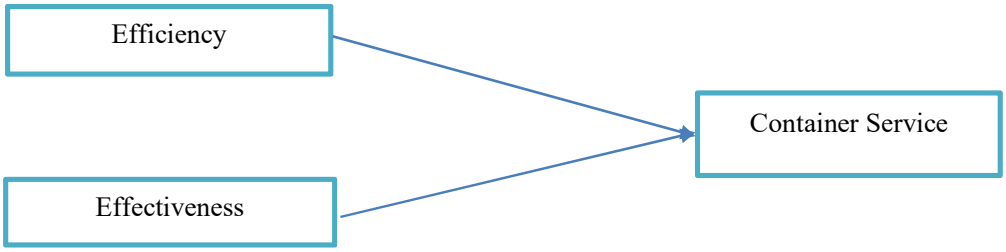

Figure 1. Model Of Research

Method

The principal purpose of this research is to describe the system technology in flow and improving containers at the ports, and their impact on the effectiveness of shipping activities. This study employed a qualitative technique with descriptive analysis, in which the primary data was acquired through an in-depth interview with a semi-structured interview focusing on stakeholder perspectives on the influence of technology on container service efficient and effective. The goal is for the researcher to learn more about how technology affects the real-world situation of container service , whether it is international or domestic. The data was processed utilizing the Miles and Hubberman approach as a data analysis tool after the data collection was completed. Informants with the capability and relevant expertise of information in line with the needs of this study were used as data sources in this work (Miles et al., n.d.)

Because the purpose of this study is to determine The Impact Of Technology On Efficiency And Effectiveness Of Container Service In Tanjung Priok, the professionals were asked to provide information on not

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only logistics, ports, and throughput, but also daily logistics room, port, efficiency, and effectiveness in the port.

The informants in this study were:

1. Assistant Senior Manager Operation Planning and Development at PT. IPC TPK
2. Senior Operation Planning and Development at PT. IPC TPK
3. Senior Yard Planner at PT. IPC TPK

In this scenario, interview-related elements were additionally included.

Table 1. Interview elements

No	Focus	Aspect
1	Stakeholder	Anyone associated with the port
2	Standardization	The process of conforming something to an international or domestic standard
3	Obstacles to be aware of	Operating costs, failure to operate optimally/normally, and other issues.
4	Indicators of things that require attention	Human resources, business processes, infrastructure and facilities, equipment, and technology are the five components.

Discussion And Result

The port of Tanjung Priok was chosen as the study's focus for a variety of reasons. Tanjung Priok Port, located on the shore of North Jakarta, is Indonesia's largest and busiest port. The Port of Tanjung Priok is the main port on the island of Java due to its strategic location with a hinterland that is a hub of trade and industry activities.

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The activities of various government agencies are shown to facilitate the implementation of the main tasks and functions of the port. Government agencies in the sense of authority or law enforcement for shipping and/or shipping are Port Administrator and Harbor Master. Like ports in general, other government agencies known by the acronym CIQ, namely Custom, Immigration, and Quarantine, are also active in the port environment.

The port performance has typically concentrated on the internal components of port operations, owing to the port's role as a connector between land and marine transport. However, in the global supply chain era, it is suggested that Port Performance should reflect the effectiveness of ports in terms of consumer perceptions and expectations. This is especially crucial given that port integration is primarily focused with increasing customer service and operational efficiency (Elgazzar & Ismail, 2021). In determining standardization, be it international or domestic, the process of doing or serving any business process at almost the same price, there is no significant difference, it's just that there are several indicators of difference, (1) International KPI's are higher than domestic, because their ships are bigger; and strict (especially related to the schedule)whether it be with the port of Tanjung Priok or other ports; (2) In the document process, for International through customs, quarantine, licensing, etc. Usually the process is before the ship docks, the clearance in-out of customs; (3) Customers are different, for international usually large ships with ROA or LOA are already outside, while for domestic the ships are hub of middle usually transported by panamax ships.

With the support of technology and modern amenities, Port of Tanjung Priok port. Container flow at this port continues stable tend to increase every year (Throughput International & Domestic Tanjung Priok ,2021), start from April 2017 until April 2021.

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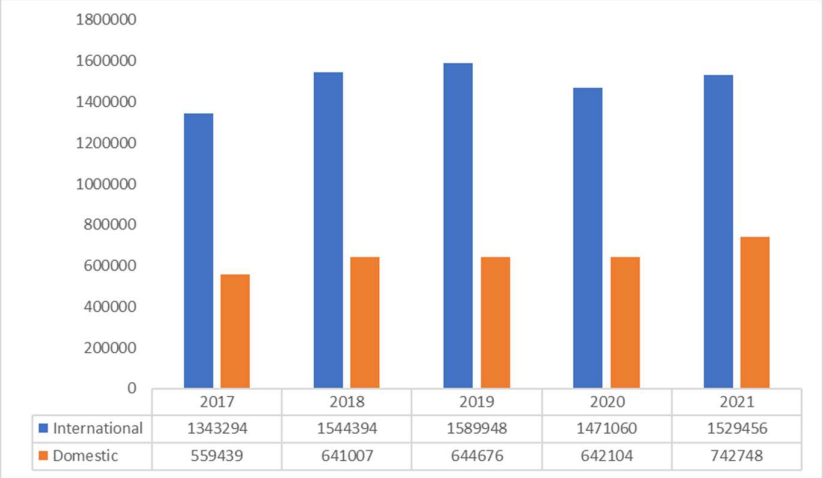

	2017	2018	2019	2020	2021
International	1343294	1544394	1589948	1471060	1529456
Domestic	559439	641007	644676	642104	742748

Source : IPC annual report 2021

From 2017 to 2021, there has been an increase in every year, suggesting that container service flow employing system technology has increased in speed and accuracy. Previously, the search for data or information/receiving information at the Port was still done manually, there was a chance that the revenue would not be recorded as a consequence of untidy the process. Nevertheless, since the Port now uses a technology system that is faster and more accurate, and the data is more accurate or valid. However, incremental progress is currently being made in the area between entirely manual and fully automated systems. To reap some of the benefits of automation, remote control, automated process control, assistive technology, block chain, or 'other smart' technologies can be introduced to the current manual system.

Prior to 2017 and in that year, Tanjung Priok port was still using the manual system, or partially semi-manual, it can be seen that in 2018 there was an increase when the overall system digitalization was started, significant growth increased until 2019. The results of the performance of Port Throughput International & Domestic Tanjung Priok ,(2021) experienced a decline due to the Covid-19 pandemic.

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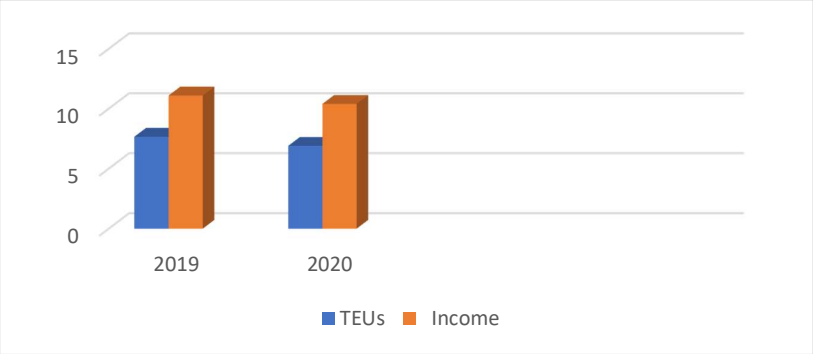
Entering 2020, the Pandemic Covid 19 has an impact on the process of distributing goods at the ports it manages, due to the outbreak of the corona virus, the production of goods has also decreased.



Source : Press Release - IPC - Pandemic Covid-19 (Release, 2021)

Based on PT Pelabuhan Indonesia II (Persero) /IPC in 2020 experienced a decline due to the Covid-19 pandemic. From the audited operational achievements, it was recorded that the flow of containers during 2020 reached 6.92 million TEUs. This figure has decreased by around 9.64% compared to 2019 which reached 7.66 million TEUs (Release, 2021)

Port operational performance is still quite affected by the Covid 19 pandemic situation in 2020 . One of the things that causes a decrease in throughput and IPC income is because large producing countries (with the largest flow of goods) have not fully operated normally. These large producing countries are quite dominant in determining the level of supply and demand or the level of goods needed for production (examples of raw materials include: steel, oil, corn, grain, gasoline, etc.).

Coupled with the threat of an economic recession in the country. During 2020, there was a decrease in the flow of containers and also non-containers. Operational costs for handling Covid during the pandemic have also increased, one of which has caused IPC's income to drop during 2020. There are also several other things that cause a number of obstacles (1) including unconducive government regulation (e.g. a long lead time for customer clearance in ports); (2) a low land value chain efficiency(e.g.

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inadequacy access to road and rail connection and trucking services); (3) suboptimal port operation and infrastructure (e.g. long turnaround time and insufficient port infrastructure); (4) low maritime value chain efficiency (e.g. highly fragmented shipping liners and overuse of small vessels); and (5) demand supply imbalance (e.g. concentrated demand in Java leading to empty containers). In 2021 so far, the Covid-19 pandemic which has a serious impact on port performance, is still in the process of recovery and shows that there is a gradual improvement.

The port's performance was assessed using two second-order assessment models: effectiveness (EFC) and efficiency (EFF). External factors of port operations such as service quality (reliability, timeliness, information providing), client orientation (e.g. responsiveness, flexibility), and service price are included in the Effectiveness (EFC) (e.g. cargo handling fees, storage charges). Furthermore, the Efficiency (EFF) factor incorporates internal operational characteristics such as sea-side and land-side operations, as well as other cargo handling activities (ship waiting time, ship turnaround time, cargo handling time, time from entry to exit of port, and other measures), (Woo et al., 2013)

Container service in the Tanjung Priok Port region is the level of container production provided by a container terminal stated in TEUs (Twenty-foot Equivalent Unit System) during a set period of time, either monthly or annually. Container terminals can be thought of as open material flow systems with two exterior interfaces. These interfaces are the quayside, which is used to load and unload ships, and the landside, which is used to load and unload containers onto and off vehicles (Steenken et al., 2004). In the business process, carrying out the process of revamping or transforming from what was previously non-standard to standard based on safety, effectiveness, efficiency where all activities have been or are handled based on / based on the planning and control function. For human resources, change management is provided with training and sharing knowledge about a correct and standardized terminal container, so that the effectiveness and

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efficiency of the training is proven on time, completed on schedule, participants respond well to the material, participants absorb and mastering the meaning and purpose, use of classrooms, and filler according to learning by the instructors according to the plan. It is based on the expected level of productivity, estimates of ship and cargo traffic density, and the necessity for service facilities when planning port development. The amount of productivity has a considerable impact on the ship's time in port or time at berth (ship's time at berth). The traffic density of ships and commodities, as measured by the number of ship visits and the number of cargo (throughput), is used to forecast the requirement for basic or supporting facilities. The facility requirement plan is consistent with the long-term strategy plan, which envisions a competitive port on a global scale. In technology-intensive terminals, loading and unloading equipment or loaders - unloaders are a concern. Equipment performance must reach an optimal level including availability, maintainability, and reliability. In terms of technology, a Terminal Operating System (TOS) is a vital part of a terminal and primarily aims to control the movement and storage of various types of cargo. The existence of a TOS system can inform an activity that is interconnected, from planning to the release of goods from the port.

After all points have been done, such as business processes, human resources, infrastructure and facilities, and equipment, a technology system is required to aid these transactions, such as operations, reporting, tracking, input, real-time work, and so on. Most terminals are introducing new technologies, optimizing equipment dwell times, improving storage density, optimizing ship turn-around times, and optimizing truck turn-around times to boost throughput and capacity (Huynh et al., 2005). With the use of information technology, which is currently being heavily supported by both central and regional governments, all of each obligations and functions may run smoothly, swiftly, exactly, and accurately.

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Conclusion

The research provided a framework for assessing a container terminal's performance in terms of efficiency and effectiveness. An empirical study on the Tanjung Priok container terminals from 2017 to 2021 was conducted to evaluate their performance and demonstrate the applicability of the proposed framework. Because the purpose of this study is to determine The Impact Of Technology On Efficiency And Effectiveness Of Container Service In Tanjung Priok, the professionals were asked to provide information on not only logistics, ports, and throughput, but also daily logistics room, port, efficiency, and effectiveness in the port. From 2017 to 2021, there has been an increase in every year, suggesting that container service flow employing system technology has increased in speed and accuracy.

Container terminals can be thought of as open material flow systems with two exterior interfaces. In the business process, carrying out the process of revamping or transforming from what was previously non-standard to standard based on safety, effectiveness, efficiency where all activities have been or are handled based on / based on the planning and control function. For human resources, change management is provided with training and sharing knowledge about a correct and standardized terminal container, so that the effectiveness and efficiency of the training is proven on time, completed on schedule, participants respond well to the material, participants absorb and mastering the meaning and purpose, use of classrooms, and filler according to learning by the instructors according to the plan.

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