



Awel Suryadi^{1*} ○ Fuad Ardani Rahman²

Evaluation of Facilities Improvement and Utilization Strategy Tegal Port

Abstract: According to the national port master plan, Tegal Port is a hub port. In practice, a number of fishing boats crowd the port pool area thereby disturbing the area that should be used for the port loading and unloading process. Full port facilities are not supported by this circumstance. Commercial ships wishing to enter the port must wait for the tide to enter the waters of the port pool because shipping lanes enter the port wisely around 3 LWS. This study aims to examine the relationship between the port facility utilization index and the port facility performance index in several categories of capacity accessibility and satisfactory performance levels, in the categories of safety, order, smoothness and speed, and pollution experienced unsatisfactory performance. This research uses a descriptive method. Data obtained from surveys and analyzed using the SWOT method. The SWOT analysis shows strength-opportunity (SO) conditions where managers must maximize the potential of ports that have facilities. The results of the SWOT analysis show that the right strategy to use for port development is strength-opportunity, namely improving existing facilities as well as possible, such as making repairs to facilities that are not suitable for use and adding facilities at the port and increasing cooperation with stakeholders by making more work agreements, promising and facilitating service users as well as cutting bureaucracy that does not complicate service users.

Keywords: *SWOT, performance index, utilization index, bathymetry, tegal port*

INTRODUCTION

Constitution of Republic Indonesia Number 17 Year 2008 about Cruise explicitly stated necessity provision infrastructure harbor as a place for intra and inter-modal movement of transportation. Port development requires proper planning, fulfilling port technical requirements, area sustainability, and paying attention to intra and intermodal transfer synergies. Therefore, the construction of ports in Indonesia within the scope of the Ministry of Transportation, especially sea transportation, will be continues to be carried out in order to support the transportation of passengers or general cargo (dry cargo or bulk) in various types of shipping, namely those that are profitable or pioneer shipping (Molavi, 2020).

Port is a place consisting of land and/or waters with certain boundaries as a place for government activities and as an operating activity used for ships to dock, board passengers and/or load and unload goods, in the form of terminals and berths equipped with shipping safety and security facilities and port supporting activities as well as a place for intra and intermodal transportation (Permenhub No. 20 of 2017 concerning Special Terminals and Terminals for Own Interests). Shipping lanes are part of natural and artificial waters which, in terms of depth, width, and obstacles in them, are considered safe to navigate (Kerner, et al, 2013). The shipping channel in the port is intended as a link between the area where

Awel Suryadi^{*}
Politeknik Ilmu Pelayaran Semarang, Indonesia
E-mail: pipsmg.awelsuryadi@gmail.com

Fuad Ardani Rahman
Politeknik Ilmu Pelayaran Semarang, Indonesia
E-mail: fuad_ardani@pip-semarang.ac.id

the ship is anchored and the waters near the wharf, usually in the breakwater. Port development can advance the economy in a region, increase state revenue and local revenue (PAD). The port also has important capabilities and acts as a profitable meeting point between economic activities at sea and the economy on land, opening business opportunities in the sea transportation sector so that they can create jobs for their citizens (Iris et al., 2019; Schipper et al., 2017).

The existence of sufficient ports has a major function in supporting the mobility of goods. Ports are important tools for connecting between islands or between countries as well as regional economic development to support international and domestic trade on a very large scale and also support the growth of industry and trade which are part of the port's efforts so that its operations can be carried out effectively, efficient, and professional so that port services become smooth, comfortable, and fast at affordable costs (Deng et al., 2013; Ishii et al., 2013; Parola et al., 2017). Harbor wharf is a port building used for docking and tether boat Which unload loading and unloading goods passengers (Dooms et al., 2013). Services provided by ports are basically services for ships, goods, and passengers (Muslim, 2016).

Problem management harbor as arranged in The Law of the Republic of Indonesia Number 17 of 2008 concerning Shipping must be pursued professionally and optimally as is currently happening, the Port in Tegal City is the theme interesting For researched. In accordance with the decision of the Minister of Transportation of the Republic of Indonesia No. KP. 432 of 2017 concerning the National Port Master Plan, class IV port of Tegal is a hub port. Meanwhile, the current condition of the Tegal Port as a Collector Port is that its utilization has not been maximized. The purpose of this study is to describe the facilities and utilization as well as strategies that are suitable for improving and utilizing Tegal Port facilities.

METHODS

The research method used is a descriptive survey, which is a research method that focuses on solving actual/updated problems and occurring in the present by collecting as much data as possible and regarding the factors that support the research then compiled and clarified and analyzed then interpreted (Park et al., 2016). The research location is the Port of Tegal which is located in the village of Tegalsari with geographic coordinates 109° 12'00" BT and 06° 51' 00" L. The data collection method is divided into 3 parts, namely direct observation in the field, interviews, and document analysis. According to Earley (2014) observation is research by making thorough observations of a certain condition. Interview is a process to obtain information with questions and answers between researchers and the subjects studied. Documentation is a study of documentary materials from data on companies, institutions and documents.

The data analysis used was SWOT analysis, namely to determine the strategy at the port (Puyt et al., 2020) which previously collected questionnaire data from respondents and then analyzed by making internal and external SWOT matrices for the factors obtained (Benzaghta et al., 2021). Weighting, assessment, and suspension is calculated from questionnaire data that has been given to respondent. After obtaining the score for internal factors and scores for factors externally, port positioning Tegal can be known through the "grand strategy" matrix. The last step is taking the decision is how the strategy to be taken.

RESULTS AND DISCUSSION

The Port of Tegal is a closed type of port, which means that if ships going into and out of the pier of the Port of Tegal have to go through an adequate sluice and channel, of course, the difference in tides is taken into account to ensure that the ship does not run aground. The average tide height is around 9 meters and the average -The average low tide is around 4 meters, so the role of the Meteorology and Geophysics Agency (BMKG) to

provide daily weather information is very important to maintain the safety of shipping in and out of the harbor pool.



Figure 1. Shipping Channel Watergate to Tegal Commercial Port

Tegal Port is a quite strategic collecting port because it is close to large ports such as Tanjung Mas, Semarang and Cirebon, but according to the types of activities that may be carried out at this port, it is included in the river port because this port can only carry out domestic trading activities so that foreign ships cannot it is permissible to just lean on the Port of Tegal, so that if there are commodities needed in the Tegal area from the cargo of foreign-flagged ships, they must first unload cargo at the Port of Semarang or in Cirebon, then the goods are brought to Tegal using land transportation or sea transportation with Indonesian-flagged ships.

Tegal Port has a shipping channel length of 1,000 meters with a channel width of 50 meters and an area of $50,000 \text{ m}^2$. The current condition of the Tegal Port shipping lane is siltation caused by sedimentation and waste/garbage from the area around the port. There is a narrowing of the shipping lanes at the Tegal Port due to the large number of ships queuing to wait for the queue to enter the docking area, there is no awareness and strict regulation, so order will be disrupted, including the mooring of ships in the in and out channel area at the port, thus disrupting shipping when The ship will stop at the Port of Tegal.



Figure 2. Jetty entrance blocked by ships

The length of the Tegal Harbor pier is 260 m long, 10 m wide and $2,600 \text{ m}^2$ wide with a carrying capacity of 2 tons/m^2 , which is a type of wharf pier because this pier is parallel to the beach and coincides with the coastline. The condition of the wharves and stacking yards at the Tegal Harbor is still feasible to function, this has also been done when there were barges loading river stone to be shipped. The Tegal Port Wharf has a port pool which functions to facilitate ships in carrying out maneuvers before placing their position and

mooring at the port wharf, but in reality the Tegal Port pool is filled with fishing boats mooring their ships at the port wharf. The increase in fishing vessels which was not comparable to the mooring facilities for fishing boats was due to the lack of adequate mooring facilities provided by local fishing port facilities, so fishing vessels anchored their boats in the Tegal Port area which should be used for loading and unloading of commercial vessels and port pools for maneuvering. ship before berthing.



Figure 3. Commercial port pool filled with fishing boats



Figure 4 . Tegal Commercial Port wharf filled with fishing boats

There was siltation port channel caused by sedimentation and waste/garbage from the area around the port. Apart from that, there are also many fishing vessels parked in the harbor pool because there is a fish auction area in the Tegal Harbor area. As the number of ships in the Port of Tegal increases, cleanliness/pollution problems will automatically arise both inside and outside the port pool. The depth of the grooves and ponds must be updated regularly to ensure the comfort of shipping service users so that the crew and ship owners and cargo owners do not hesitate to enter the port wharves, in fact the ships leaning on the Port of Tegal are ships with Dead Weight Tonnage. (DWT) is not too large but the depth of the ship's draft cannot be predicted because it depends on the cargo in the hold/cargo so service users will ensure to the port manager that the ship can enter the dock safely. Regulation of the depth of the grooves can be done by dredging, referring to the Regulation of the Minister of Transportation of the Republic of Indonesia Number PM 53 of 2021 concerning Amendments to the Regulation of the Minister of Transportation Number PM 125 of 2018 concerning Dredging and Reclamation. The depth of the Tegal Port channel is quite shallow for the criteria for a collecting port because the average depth only reaches 3-4 m LWS which should be according to the Decree of the Minister of Transportation No. KP. 432 of 2017 concerning the National Port Master Plan, the depth of the port starts from -7 meters to -9 m LWS survey data that has been carried out regarding channel bathymetry as follows:

Table 1. Results of the Sailing Batrimetry Survey at the Port of Tegal

	Location I	Location II	Location III	Location IV	Location V	Location VI
Ship Position (AIS)	-S 06 ° 51.133 -E 109 ° 08.213	-S 06 ° 51.037 -E 109 ° 08.256	-S 06 ° 50.973 -E 109 ° 08.238	-S 06 ° 50.834 -E 109 ° 08.203	-S 06 ° 50.672 -E 109 ° 08.194	-S 06 ° 50.750 -E 109 ° 09.820
Ship Position (Map)	6.852213,109.136966	6.850509,109.137613	6.848824,109.137121	6.846660,109.136546	6.846660,109.136589	6.844387,109.146622
Depth (AIS)	4.30	4,10	4.00	3.70	3.50	4,4
Depth (Manual)	4.32	4.05	4.00	3,18	3.50	4.30

Information:

1. Using a ship that has an Automatic Identification System
2. Ship Trim at sampling 0.45
3. The tilt of the ship is measured using a clinometer, namely 0 °
4. The waves in the pond waters are 0 m, the channel is 0.5 m and the anchorage area is 0.7 m
5. Weather during sampling Cloudy

Sampling is carried out at 7 collection points which will later be measured using AIS and manually using a sounding tool depth gauge with the distribution of locations and sampling maps as follows.

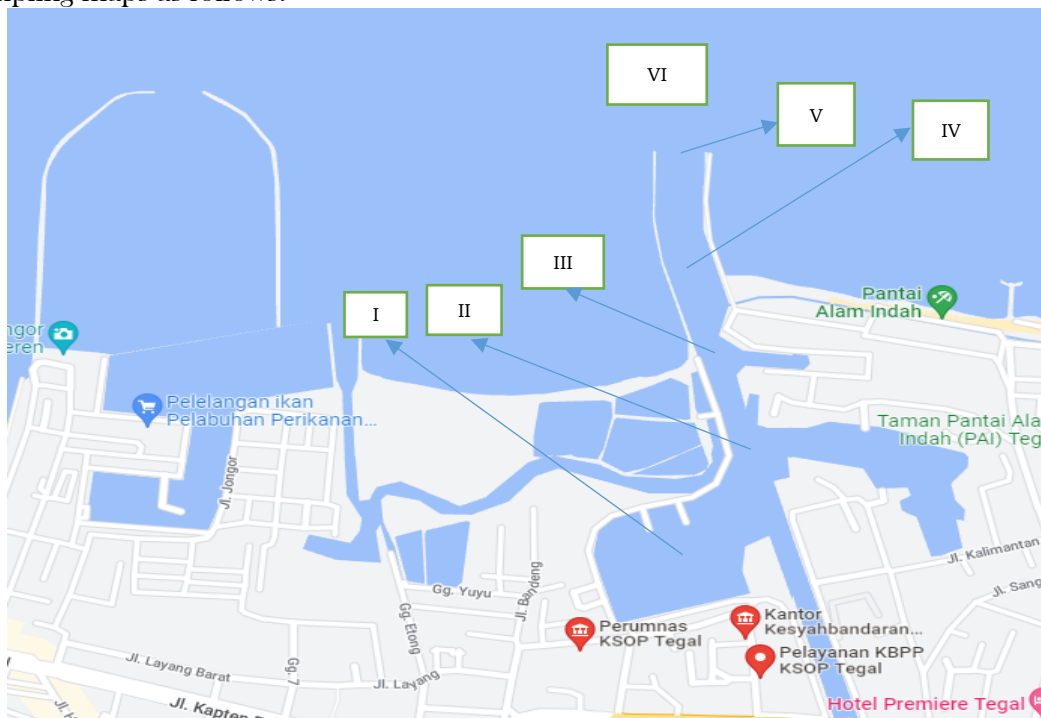


Figure 5. Map of harbor channel bathrimetry sampling

Remarks Sampling map distribution

Location I : Harbor wharf pool

Location II : The connecting door between the pool and the port channel

Location III : Entrance channel connected to the ship docking area

- Location IV : Port Channel which is connected to the docking gate area
 Location V : Entrance to the channel from the open sea
 Location VI : Ship anchorage area

Currently , to facilitate shipping agents and ease of service, the Port of Tegal has used the Inaportnet application. Every company must register their ships in the Inaportnet application with the following services: 1) incoming and outgoing ships; 2) mooring or anchoring period extension; 3) change mooring or mooring places; and 4) cancellation.

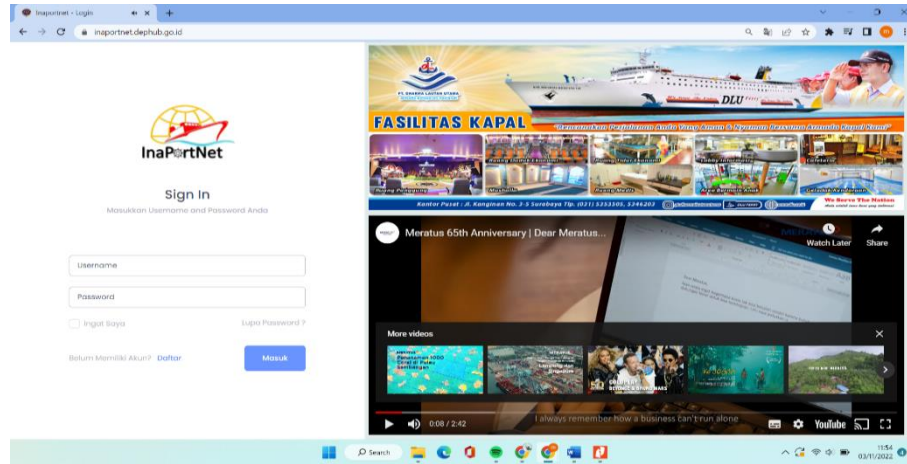


Figure 6. Front view of Inaportnet homepage

Table 2. Internal Factor Evaluation (IFE) Matrix Scoring and Internal Factor Evaluation (EFE)

Internal factors	Amount	Weight	Ratings	Score
Strengths				
S1: Basic, functional and supporting facilities that are suitable for use	22	0.12	4	0.45
S2: The location of the Tegal Port is strategically located, both the position of the port and the hinterland, making it easier for stakeholders	20	0.11	3	0.37
S3: Human resources/operators supporting activities at the port and its surroundings are experienced in utilizing port facilities	27	0.15	5	0.68
S4: Access to Tegal Port is geographically feasible	24	0.13	4	0.54
Total	93	0.52	15.5	2.03
Internal factors	Amount	Weight	Ratings	Score
Weaknesses				
W1: Main, functional and supporting facilities that are not suitable for use	27	0.15	5	0.68
W2: Human resources/operators supporting activities at the Port and its surroundings are incompetent/most of them have low education	17	0.10	3	0.27
W3: There is siltation in the harbor basin	15	0.08	3	0.21
W4: Tegal Harbor and its surroundings as a source of environmental pollution	26	0.15	4	0.63
Total	85	0.48	14.2	1.80
TOTAL IFAS	178	1.00	29.67	3.83
IFAS Difference (Strenght-Weakness Score)	0.24			
External Factors	Amount	Weight	Ratings	Score
Opportunity				
P1: There are clear regulations/policies in managing ships carrying out activities in the harbor pool	20	0.11	3	0.37
P2: It becomes a priority for stakeholders to moor/unload cargo	22	0.12	4	0.45
P3: Increased shipyards around the port	27	0.15	5	0.67
P4: Increased macro and micro companies around the port	22	0.12	4	0.45
Total	91	0.50	15	1.93

External Factors	Amount	Weight	Ratings	Score
Threats				
A1: The berthed ship does not carry out the berthing procedure according to the KSOP policy	25	0.14	4	0.58
A2: The competence and knowledge of fishermen is inadequate/incompetent so that it can endanger the port	22	0.12	4	0.45
A3: Many stakeholders who are not engaged in business do not have permits/amdals so that they damage the environment around the port	22	0.12	4	0.45
A4: There is abuse of authority against a person or group resulting in administrative and financial losses	21	0.12	4	0.41
Total	181	1.00	30	4
EFAS Difference (<i>Opportunity-Threat Score</i>)			0.06	

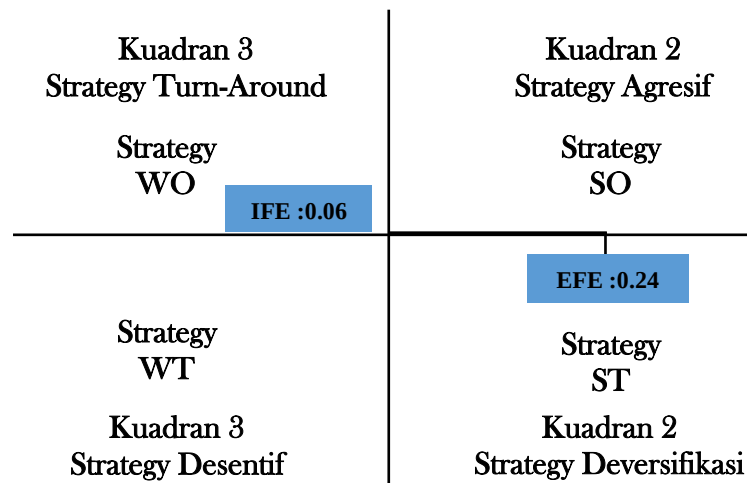


Figure 7. Relationship diagram of *Importance Index and Performance Index*

The results of the SWOT analysis show that the right strategy to use for this research is strength-opportunity, which means strengthening or increasing the potential of the port to get opportunities or possibilities that can be utilized by the Port of Tegal in the present and in the future , here is a matrix that can be used or possible strategies that can be used.

Table 3. Internal Factor Evaluation (IFE) and External Factor Evaluation (EFE) Matrix

Results		
IFAS	Strength / Strength	Weaknesses (W)
efas	1. Basic, functional and supporting facilities that are suitable for use	1. Basic, functional and supporting facilities that are not suitable for use
	2. The location of Tegal Port is strategically located to make it easier for stakeholders	2. Human resources/operators supporting activities at the port are less competent
	3. Experienced human resources/operators supporting activities at the port	3. Silting in the harbor pool channel
	4. Access to Tegal Harbor is geographically feasible	4. Tegal Harbor is a source of environmental pollution

Opportunities (O)	SO strategy	WO strategy
1. There are clear regulations/policies in managing ships in the harbor pool	1. Improve existing facilities as best as possible such as repairing facilities that are not suitable for use and adding facilities at the port (S1, S2, S4, O1, O3)	1. Providing excellent and professional service for services and improving port facilities (W2, O1, O2, O3, O4, W1)
2. It becomes a priority for <i>stakeholders</i> to moor/unload cargo	2. Increase collaboration with stakeholders by making work agreements that are more promising and make it easier for service users and cut bureaucracy that does not make it difficult for service users (O2, S3, S4)	2. Provide education on the importance of pollution (W4)
3. The addition of shipyards around the port		
4. Increased macro and micro companies around the port		
Threats Threats (T)	ST Strategy	WT Strategy
1. The berthing ship does not carry out the SOP according to the KSOP policy	1. SOP must cover public needs for services and security and safety (S3, T1, T4)	1. Dredging is carried out to provide convenience for service users (W3)
2. The competence and knowledge of fishermen is inadequate/inadequately competent	2. Prepare human resources for when and port operators properly (T2)	2. Obliging service users to carry out the provisions as appropriate (T3, W4)
3. The large number of stakeholders who are not engaged in business do not have permits/amdal		
4. There is abuse of authority against a person or group resulting in losses		

Based on the table above, the strength-opportunity in question is improving existing facilities as well as possible, such as repairing facilities that are not suitable for use, such as revamping harbor channels and pools by dredging and adding facilities at the port (S1, S2, S4, O1, O3) as well as increasing cooperation with stakeholders by making work agreements that are more promising and easier for service users and cutting bureaucracy that does not make it difficult for service users (O2, S3, S4). In order to maintain existing port facilities, as related port stakeholders, they always carry out more intense socialization on the importance of cleanliness and also the provision of adequate cleaning facilities and port pool cleaning staff, coupled with strict and clear enforcement of rules regarding cleanliness, order in mooring and docking boat.

CONCLUSION

Based on the results of the discussion, it can be concluded that the Tegal Port facilities are adequate even though this port is a hub port, but the facilities provided can help activities around the port. However, in reality, the entrance to the Tegal Port is hampered due to the large number of ships that dock, the Tegal Port pool is filled with fishing vessels mooring at the port docks, the depth of the Tegal Port channel is shallow enough for the criteria for a collecting port. The results of the SWOT analysis show that the right strategy to use for port development is strength-opportunity, namely improving existing facilities as well as possible, such as making repairs to facilities that are not suitable for use and adding facilities at the port and increasing cooperation with stakeholders by making more work agreements, promising and facilitating service users as well as cutting bureaucracy that does not complicate service users.

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