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Implementing Sustainable Port in Indonesia

A Case Study of Port of Gothenburg

Master's thesis in Maritime Management Master Study

DHANESWARA AL AMIEN

DEPARTMENT OF MECHANICS AND MARITIME SCIENCES
Maritime Management Program
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Department Mechanics and Maritime Sciences

Telephone + 46 (0)31-772 1000

Cover:

Aerial View of Port of Gothenburg

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ABSTRACT

The sustainability concept has been introduced in the early 1700s. The concept of sustainability has developed from the original Triple Bottom Line (TBL): financial, social, and environmental aspects. The changes depend on the type of the industry and its contributions. The United Nations (UN) also agrees that there is a need for collaboration on national and regional levels towards a better future. The UN published Sustainable Development Goals (UN SDGs) in 2015 to help the global movement.

Sweden implemented sustainability to its national vision from 1989 with the Natural Step. The Natural Step introduced and brings the competitive advantage. The national vision was also adopted by municipalities, including the Gothenburg Municipality. The Municipality published The City of Gothenburg Green Bond Framework as its reference towards sustainability. The municipality-owned companies are also required to implement it in their business model, including the Port of Gothenburg.

The Port of Gothenburg in Sweden is one of the most respectable sustainable ports in the world. Port of Gothenburg practices of sustainable port has been considered as a role model in maritime industries. This study shows the practice of a sustainable port including the difference between sustainable port and green port concept, the concept of sustainability, and the relation to the port industry.

This study also shows the comparison of academic sustainability assessments. The most suitable academic assessment used to review Port of Gothenburg's performance towards sustainability. The assessment shows the correlation between four perspectives of Port of Gothenburg's performance from 2015 to 2019. The reviewed sustainable port concept by Port of Gothenburg is used as a best practice to perform the gap analysis of Tanjung Priok Port in Indonesia. Tanjung Priok Port developed the Ecoport concept on its contribution to sustainability.

The study resulting in the overview of a sustainable port: the cost and benefit; driving forces; financial, social, environmental, and internal forces performance correlation, and the strategy map. This study also found that there are gaps of Tanjung Priok Port towards sustainability in the financial, social, environmental, and reporting aspects.

Keywords: maritime, sustainable port practice, sustainability assessment, strategy map, Gap Analysis.

PREFACE

This Master's thesis has been performed at the Department of Mechanics and Maritime at Chalmers University of Technology, Sweden, from January to October 2020. This thesis is made possible with the work of amazing people and organizations worth mentioning.

I would like to thank Kent Salo as the supervisor of this thesis. His sharing of knowledge, vision, and time affecting this whole thesis towards the better side. The passion to never stop learning is such a quality of a researcher. I also would like to thank Edvard Molitor, Senior Environmental Manager at Port of Gothenburg for his time for the interview and corporation. The transparency and ease of bureaucracy made this thesis work painless.

This master thesis marks the end of my master's study at the Chalmers University of Technology. With my study, I learned much about the maritime industry business and also the importance of sustainability for the future. My study is fully sponsored by the LPDP Scholarship the from Ministry of Finance, Indonesian Government. Thank you for making my dream comes true.

Göteborg, April 2021
Dhaneswara Al Amien

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1 Introduction

An early example of sustainability term has been discussed since the 1700s, when the forestry industry longevity is threatened by the vast development of the mining industry and housing in Saxony, Germany. The mine manager, Hans Carl von Carlowitz wrote the book about the need for forest management to overcome wood scarcity (Carlowitz, 1713). The United Nations (UN) first mentioned sustainability in the Declaration of the United Nations Conference on the Human Environment in Stockholm, 1972 (United Nations , 1972). It is understood that humanity has changed the shape of the world and its resources, which should be used wisely for global development. Then, the global movement towards sustainability declaration followed with reports and conferences. The reports and conferences of the UN that discussed the importance of sustainability are:

1. World Commission on Environment Development: Our Common Future or Brutland Commission report in 1987 (United Nations, 1987).
2. Environment and Development conference in Rio de Janeiro, Brazil in 1992 (United Nations, 1992).
3. World Summit on Sustainable Development in Johannesburg, South Africa in 2002 (United Nations, 2002).
4. The United Nations Summit in 2015, The 2030 Agenda for Sustainable Development (General Assembly United Nations, 2015).

The 2030 Agenda for Sustainable Development mentioned there are three main elements of sustainable development: people, planet, and prosperity. The Agenda published 17 goals known as Sustainable Development Goals (SDGs), with 169 associated targets that are integrated and indivisible (General Assembly United Nations, 2015).

Sweden has integrated sustainable development into its national and international policy goal (Ahlberg, 2009) (Referingskansliet, 2006). Started in 1989, a framework proposed by Karl-Henrick Robert: The Natural Step (Robèrt, 2002). The idea is to make balance to the system or business for the longer term. The concept is to have sustainable development, saving the environment without sacrificing economic growth, and the cost that comes with it is considered an investment. Business is the main driver of the problem since their agenda is not to save the environment rather have kept it profitable. The transition periods of the implementation would be expensive and causing competitive

disadvantage, thus the idea must be supported by the government and raise international engagement (Robèrt, 2002).

One of the most important industries to a maritime nation is port. Ports are nodal points or hubs in the transport network where industrial and business areas add value to the transported goods (PIANC, 2014). The port is a window for a maritime nation, where it could be the source of its development (United Nations Conference on Trade and Development, 2018). Unfortunately, there is still no available method for a port to report uniformly in sustainability (Maigret, 2014). The reasons are the different definitions of a port some view port as the port authority office while others view port as the whole system of the port, and others seem to consider it in between (Maigret, 2014). The Global Reporting Initiative (GRI) standards are the most common method used by the biggest ports in the industry including Port of Gothenburg (Port of Gothenburg, 2018).

1.1 Objectives

The objective of this research is to find the means of sustainable port and how the ongoing strategies of a sustainable port could be implemented in different ports. By doing so, this study could help the stakeholders to set strategies towards sustainable port planning.

1.2 Research Questions

This study is driven by the main question of the gap in the port sustainability approach of Indonesia, especially Tanjung Priok Port in Jakarta. To analyze the gap, the study includes Port of Gothenburg as best practice. Port of Gothenburg in Sweden is well known as one of the most respectable sustainable ports in the world. Three questions of this study are:

1. How a sustainable port practices its sustainability work?
2. How does a sustainable port practice compare to academic assessment?
3. What are the gaps in the Tanjung Priok Port approach to sustainability?

1.3 Limitation

This study focus will focus on strategies and framework of sustainable port in business terms other than the technical side. The study took place in Sweden where the area of

study are Sweden and Indonesia. The study will have a combined method of qualitative and quantitative to analyze the required data. Interviews will be conducted with representatives of Port of Gothenburg and Tanjung Priok Port. The interview with a representative of Port of Gothenburg will be conducted with a face-to-face interview. The interview with Tanjung Priok Port will be conducted with the digital platform. The study will involve companies' documents. Some of the documents are publicly available and other is an internal document and requested with permission. The study results in a recommendation of the current condition of Tanjung Priok Port towards sustainability. This study is conducted during the Covid-19 pandemic situation.

2 Background and Theory

2.1 The Green and The Sustainable Port

The Green Port

The green port concept is considered as the answer to the environmental challenges faced by the port as the understanding of environmental risk raised, for example, emissions of Greenhouse Gases (GHG) (Lam & Notteboom, 2014). Green Port development is translated into the combination of port activities, operations, and management that is implemented with environmentally friendly methods (Badurina, Cukrov, & Dundović, 2017). The Green Port includes three aspects: energy conservation, environmental protection, and environmental care. One example of an early Green Port initiative is Singapore's Green Port Program (GPP), a voluntary program that offers ship operator port due/light due incentive when reducing Sulphur content below 1% (Goh, 2010).

The Sustainable Port

Like the Green Port, the term of Sustainable Port could be translated into many meanings. The most common concept of a sustainable port is the one mentioned by the World Association for Waterborne Transport Infrastructure (PIANC) together with the International Association of Ports & Harbors (IAPH):

> *A sustainable port is one in which the port authority together with port users, proactively and responsibly develops and operates, based on an economic green growth strategy, on the working with natural philosophy, and stakeholder participation, starting from a long-term vision on the area in which it is located and from its privileged position within the logistic chain, thus assuring development that anticipates the needs of future generations, for their own benefit and the prosperity of the region that it serves (PIANC, 2014).*

PIANC uses the Triple Bottom Line (TBL) theory to define the Sustainable Port, where the biggest factors are people, planet, and profit. The TBL theory is further described in section 2.3. These three aspects have to be considered to reach Green Growth, a condition where the economic development and environmental protection could develop at the same pace, not separately (PIANC, 2014).

The European Sea Ports Organization (ESPO) also agreed on the sustainability aspects of ports are social, economic, and environmental (ESPO, 2012). The social aspect includes

employment, the connection between the city and the port, knowledge development and education, and the surrounding area. While the economic aspect focuses on the Return on Investment (ROI) of projects, by maximizing the performance. The environmental aspect connects to environmental performance and management

2.2 Sustainability Indicators of a Port

Two studies by Maigret (2014) and Varvne and Tselepi (2018) suggested sets of port sustainability indicators by using Global Reporting Initiatives (GRI) Standards indicators. Both studies were conducted by qualitative research involving port stakeholders to determine the indicators. Maigret's (2014) study indicates the most frequently used, least used, and suggested indicators set for sustainable port assessment. The study includes 13 ports that have implemented GRI standards. On the other hand, Varvne and Tselepi's (2018) study focused on the Port of Gothenburg initiative in sustainability reporting analysis using GRI and its connection to the organizational structure. The summary of suggested indicators for sustainable port assessment from both studies shows in Table 1 below.

Table 1 Suggested sustainable port indicators (Maigret, 2014) (Varvne & Tselepi, 2018)

Environmental Aspect	**Financial Aspect**	**Social**
Energy - Direct energy consumption - Fuel - Renewables	Community Impact - Research and Development	Community Impact - Volunteer activity - Port annual CSR
Air emission - Total direct and indirect greenhouse gasses emissions (GHG) - Air quality - Green shipping initiative - Odor pollution - Dust and particle	Efficiency - Energy - Waste - Water - Transport - Cargo handling efficiency	Employee satisfaction - Happiness of employee - Labor structure - Employee turnover
Waste - Total waste creation - Disposal - Recycling	Labor Expenditure - Financial - Operational - Services	Employment - Direct contribution
Soil and Groundwater - Soil quality - Groundwater quality - Sediment quality	Profit and growth	Equality - Gender - Age - Nationality - Experience
Biodiversity - Compensation area		Training

Environmental Aspect	Financial Aspect	Social
Accidents - Oil - Chemical - Hazardous spills		Safety - Accidents - Accidents prevention - Cargo (dangerous good, etc.)
Management - Environmental training - Green initiative		
Marine pollution - Dredging, disposal - Water pollution - Wastewater treatment - Marine environment - Ship discharge - Water quality - Water consumption		

2.3 Academic Sustainability Measurement

The Triple Bottom Line (TBL)

The Triple Bottom Line (TBL) is a sustainability measurement introduced by John Elkington in 1997 (Elkington, 1997). John Elkington mentioned that sustainability is the phase that a business has to take. He argued that business and the market are less likely to change if there are no incentives. This condition puts governments, governance systems, and regulation in the civilization of capitalism as the moving motors behind the sustainability movement. The TBL introduced social, environmental, and economic elements that can move and develop independently. The sudden change of one aspect could lead to disturbance to other aspects.

The Triple Bottom Line does not provide a universal model for sustainability measurement, but it gives the foundation of the sustainability reporting by introducing other two dimensions (social and environment) besides the solely economic aspect. The concept could be modified to fit the business type, including corporate, government, and nonprofits.

There was a problem in Triple Bottom Line implementation, the economic aspect in TBL could be measured in financial figures but social and environmental aspects are harder to quantify. A suggested system introduced to monetize or indexing the social and environmental factors to have a global and comparable (Slaper, 2011). The goal of unifying the index is to compare the performance to other businesses. For example, the economic measure could be personal income per capita, paid taxes, revenue. While the environmental measurement could measure sulfur dioxide or nitrogen oxides concentration, other pollutants, electricity, fossil fuel consumption, or change in land use/land cover. The social could cover quality of life, average hours of training/employee, unemployment rate, or average commute time.

The Total Responsibility Management (TRM)

The Total Responsibility Management (TRM) is raised by the awareness of the quality of product or service affect the trust and relationship with the customer and other stakeholders. Managing responsibility means building trusting relationships with key stakeholders, such as employees, customers, suppliers, and communities. By ensuring that, despite power differences that may exist, the company's impact on the quality of

product or service is positive rather than negative. TRM is a systemic framework for managing responsibility for all of the companies' stakeholder and natural environment-related activities (Waddock & Bodwell, 2017).

The TRM framework uses management techniques of problem-solving, engagement, and systematic strategies. There are three core values of TRM: Inspiration, Integration, and Innovation & Improvement. The inspiration of the company comes with its vision and the core value that will continue respected for the whole time. The first step is for the company to determine its vision of responsibility and leadership. Then, the agreed value of the company has to be engaged with the stakeholders, including primary stakeholders (employees, unions, owners, suppliers, and customers) and critical secondary stakeholders (communities and governments).

Integration brings the company's vision into strategies or mission to make it happens and the company has the responsibility to human resources including training, performance appraisal, recruitment, and wage or salary policies. Then, there is a need for the integrated management system, including reward systems, information and communication system, operation, production and delivery system, delivery, purchasing, and others. Innovation and improvement create the evaluation system which leads to improvement room. It is a continual process comparing the miss operation to company value and let the stakeholder dialogue providing data and inputs for system improvement.

The measurement of TRM focuses on the three aspects: (1) company's vision, mission, and values, (2) stakeholder and environmental operating practices and impacts, (3) economic, social, and environmental performance. The idea is to provide a separate report of responsibility (TBL or other) for the related stakeholders and assure transparency. The original TRM system framework is shown by Figure 1below.

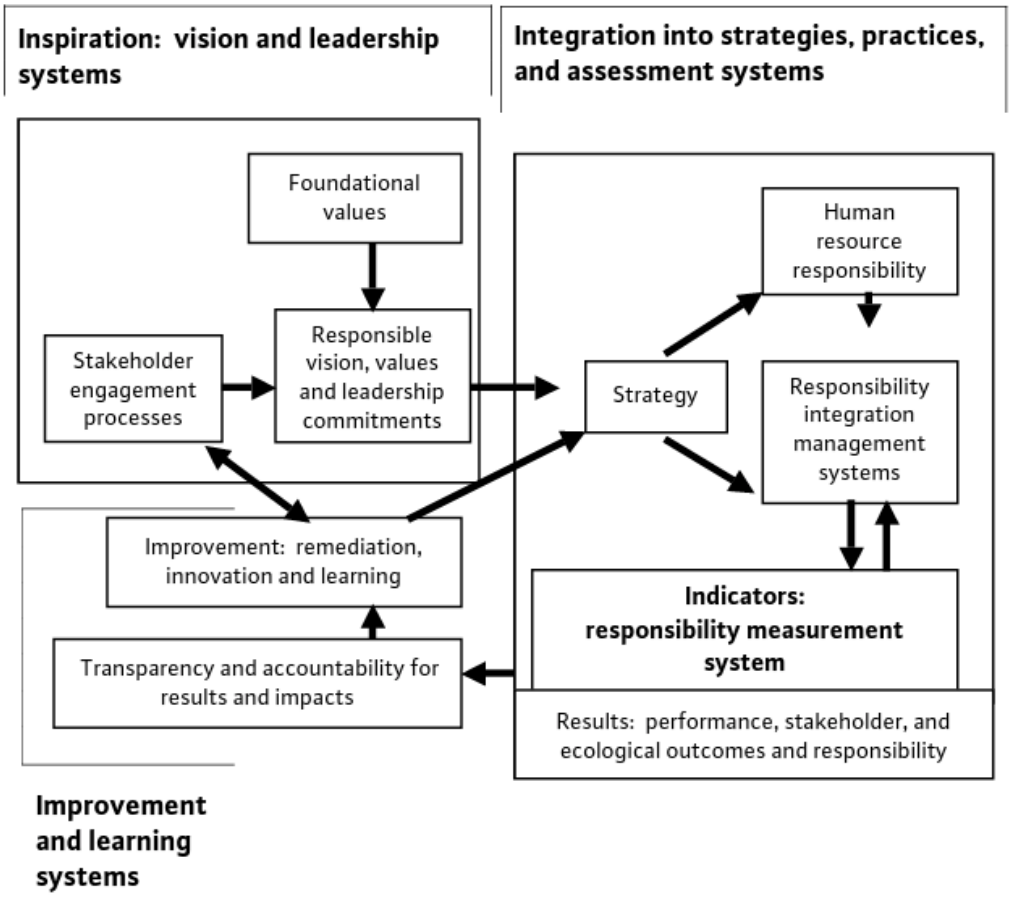


Figure 1 The Total Responsibility Management System (TRM) (Waddock & Bodwell, 2017).

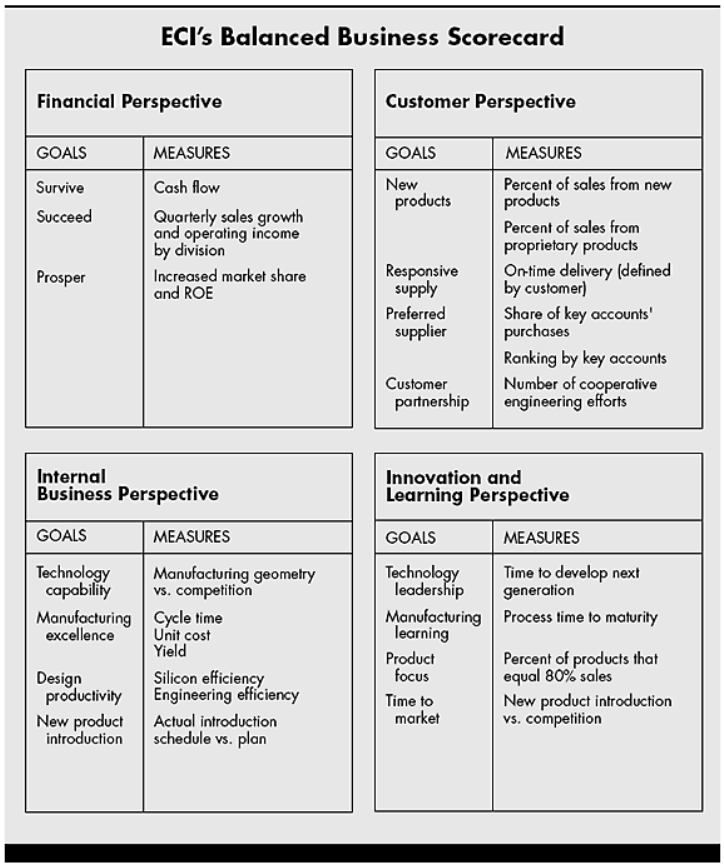
The Sustainability Balanced Scorecard (SBSC)

The Sustainability Balanced Score Card (SBSC) is the development of Kaplan and Norton's Balanced Score Card (BSC) that was introduced in 1992 that includes financial measures that tell the results of actions and complements the financial measures with operational measures on customer satisfaction, internal processes, and the organization's innovation and improvement activities (Kaplan & Norton, 1992). BSC uses the top-down approach to give the management control for the company's value in the development and management system. BSC gives room for senior managers and controllers to be involved in the company's decision as the decision making now is not only involved the financial aspect as BSC sees that the success of a company is not only measured by finance.

There are two indicators on BSC, lagging indicators and leading indicators. Lagging indicators represent a firm's past performance and leading indicators motivate future

action to improve the company's business process (Chai, 2009) (Kaplan R. S., 2010). Lagging indicators indicate whether the strategic objectives in each perspective were achieved while leading indicators show the competitive advantages of the firm and the result.

Original BSC has perspectives: financial, internal business, innovation and learning, and customers. Financial perspective measures financial performance, a strategy that a company wants to achieve and also serves as the final cause and effect relationship between another perspective in the BSC. Customer perspective represents the market segment of the business. With the strategic objective and target, the customer perspective shows the competitive advantage of the business in the market segment. The internal business perspective shows the company's internal business process to meet customer and market expectations. Innovation and learning perspectives represent the necessary infrastructure needed to achieve the other three perspectives with the most important area are qualification, motivation, and goal orientation of the employee. The example of BSC is shown by Figure 2 below.



ECI's Balanced Business Scorecard

Financial Perspective

GOALS	MEASURES
Survive	Cash flow
Succeed	Quarterly sales growth and operating income by division
Prosper	Increased market share and ROE

Customer Perspective

GOALS	MEASURES
New products	Percent of sales from new products
	Percent of sales from proprietary products
Responsive supply	On-time delivery (defined by customer)
Preferred supplier	Share of key accounts' purchases
	Ranking by key accounts
Customer partnership	Number of cooperative engineering efforts

Internal Business Perspective

GOALS	MEASURES
Technology capability	Manufacturing geometry vs. competition
Manufacturing excellence	Cycle time Unit cost Yield
Design productivity	Silicon efficiency Engineering efficiency
New product introduction	Actual introduction schedule vs. plan

Innovation and Learning Perspective

GOALS	MEASURES
Technology leadership	Time to develop next generation
Manufacturing learning	Process time to maturity
Product focus	Percent of products that equal 80% sales
Time to market	New product introduction vs. competition

Figure 2 Example of a Balanced Score Card (Kaplan & Norton, 1992).

Sustainable Balanced Score Card (SBSC) comes as the importance of the social and environmental aspect of the market transaction growing for the last 10 years in 2002 (Figge, Hahn, Schaltegger, & Wagner, 2002). The SBSC addresses the problem of corporate contribution to sustainability in an integrative way, in which the three aspects (social, economy, and environment) are relevant for a company to have permanent competitive advantages.

There are three possible ways to integrate the sustainability into original Balanced Scorecard. The first is to translate the environmental and social aspects into the existing four perspectives if the company's market is related to social or environmental aspects. Second, an additional perspective could be added to the account if the market is outside the social and environmental, extended by some perspective. The necessity of an additional non-market perspective arises when environmental or social aspects significantly influence a company's success from outside the market system but cannot be reflected according to their strategic relevance within the original four. The third alternative option to translate SBSC is the deduction of a derived environmental and social scorecard and a specific environmental and/or social scorecard can be added separately (Figge, Hahn, Schaltegger, & Wagner, 2002).

Three of the major advantages of implementing management: (1) open the chance for a company operating not only during successful times but also at crisis, (2) could serve the business as a role model in competition, (3) with environmental and social aspect integrated, the business ensures the management covers all three pillars of sustainability, which more likely to improve performances (Figge, Hahn, Schaltegger, & Wagner, 2002).

The SBSC basic requirement formula can be divided into three steps: (1) choosing a strategic business, (2) identifying environmental and social aspects of business, (3) determining strategic relevance of environmental and social aspects. The thinking process of the Balanced Scorecard is shown by Figure 3 below.

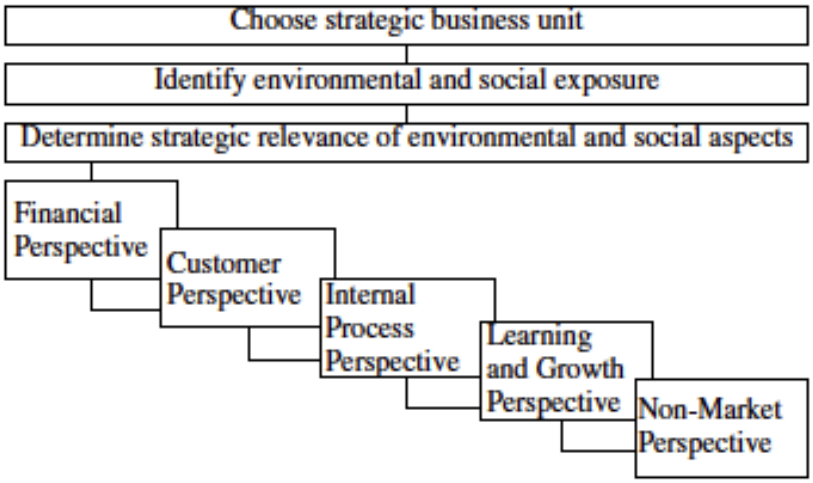


Figure 3 Process of Formulating an SBSC (Figge, Hahn, Schaltegger, & Wagner, 2002)

Related to the maritime industry, Sicilian and Jaeger (Sislian & Jaegler, 2018) have modeled the usage of SBSC for Alexandria Port business by replacing the Customer Perspective with Socio Environment Perspective according to the business model of Port Alexandria. The researchers used two different and interdependent approaches (SMBSC and structural equation modeling) to identify the relationships among the different balanced scorecard perspectives in the case of the Port of Alexandria in Egypt. The model of SBSC of the research is shown by Figure 4.

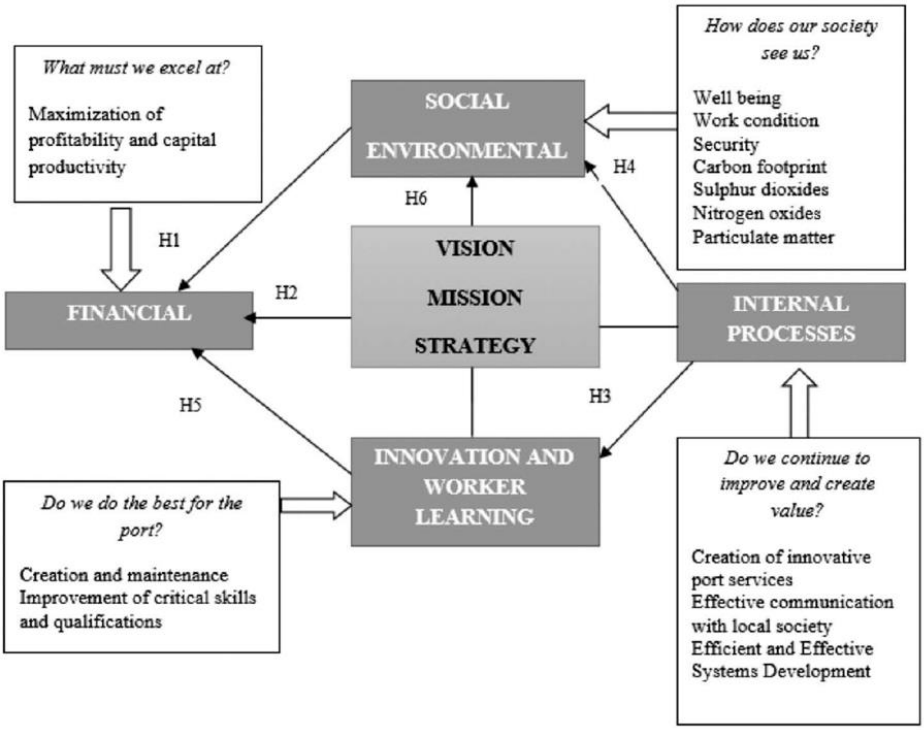


Figure 4 Sustainable maritime balanced scorecard and structural equation model Port of Alexandria (Sislian & Jaegler, 2018).

Comparison of Sustainability Measurements

There are differences and similarities between sustainability measurements theories of Triple Bottom Line (TBL), Total Responsibility Management (TRM), and Sustainability Balanced Score Card (SBSC). The comparison of four sustainability theories is compiled in Table 2.

Table 2 Sustainable Measurements Comparison

Indicators	TBL	TRM	\SBSC
General Idea	The core of sustainability concept for the industry	A method that put the industry's responsibility closer to the stakeholder's concern	An additional to the Balanced Scorecard industry management measurement concept.
Type of Adaptable Industries	Public and private business, nonprofits organization	Public and private business, nonprofits organization	Public and private business, nonprofits organization
Focus	Social, Environment, and Economics	Company's value, stakeholders, and Social, Environment, and Economics	Economic, Ecology, Society, and Environment
Steps	Not specified	Inspiration, Integration, and Innovation & Improvement	Business unit strategy, identify environmental and social aspects, and relevant strategy
Social – Environment – Economic Relation	Not related	Not related	Related

2.4 Gap Analysis

Gap analysis is a method that provides an easy-to-understand overview of the current state with the identified and prioritized future state (Karbhari, et al., 2003). The purposes of gap analysis are to identify the gaps that exist between an organization vision and current state (Nolan, Goodstein, & Goodstein, 2008). The data used in the analysis are considered as publicly available and accessible.

Four sections should be included in the gap analysis: where do the organization's current position today? Where is the organization headed? Where do they want to go? How they

get there? (Scott, 2000). There are alternative solutions to fill the gaps after the analysis (Nolan, Goodstein, & Goodstein, 2008). The first is to extend the time to achieve the target. Secondly, reduce the goal target to fit the better current situation. Third, to expand the goal to be larger. Forth, stop the resource of doing anything other than targets. Fifth, find new resource investment into the organization. Lastly, to find a new solution within the organization by promoting creativity.

2.5 Case Studies

This section covers the overview of two ports: Port of Gothenburg and Tanjung Priok Port. Port of Gothenburg is located in Gothenburg, Sweden, and Tanjung Priok Port is located in Jakarta, Indonesia.

The Port of Gothenburg

The Port of Gothenburg is the largest freight hub in Scandinavia located in Gothenburg, on the west coast of Sweden (Gothenburg Municipality, 2019). Port of Gothenburg is built in 1620 with the first harbor is Stora Hamnkanalen. In the 17th century, iron and timber were the main exports from the Port of Gothenburg. Goods were transported on barges between Stora Hamnkanalen and ships riding at anchor (Port of Gothenburg, 2019). Since 1985, the planning, building, production, and marketing of Port of Gothenburg were all gathered into one single organization, the Gothenburg Port Authority (Port of Gothenburg, 2019). The map of Port of Gothenburg is shown by Figure 5 below.

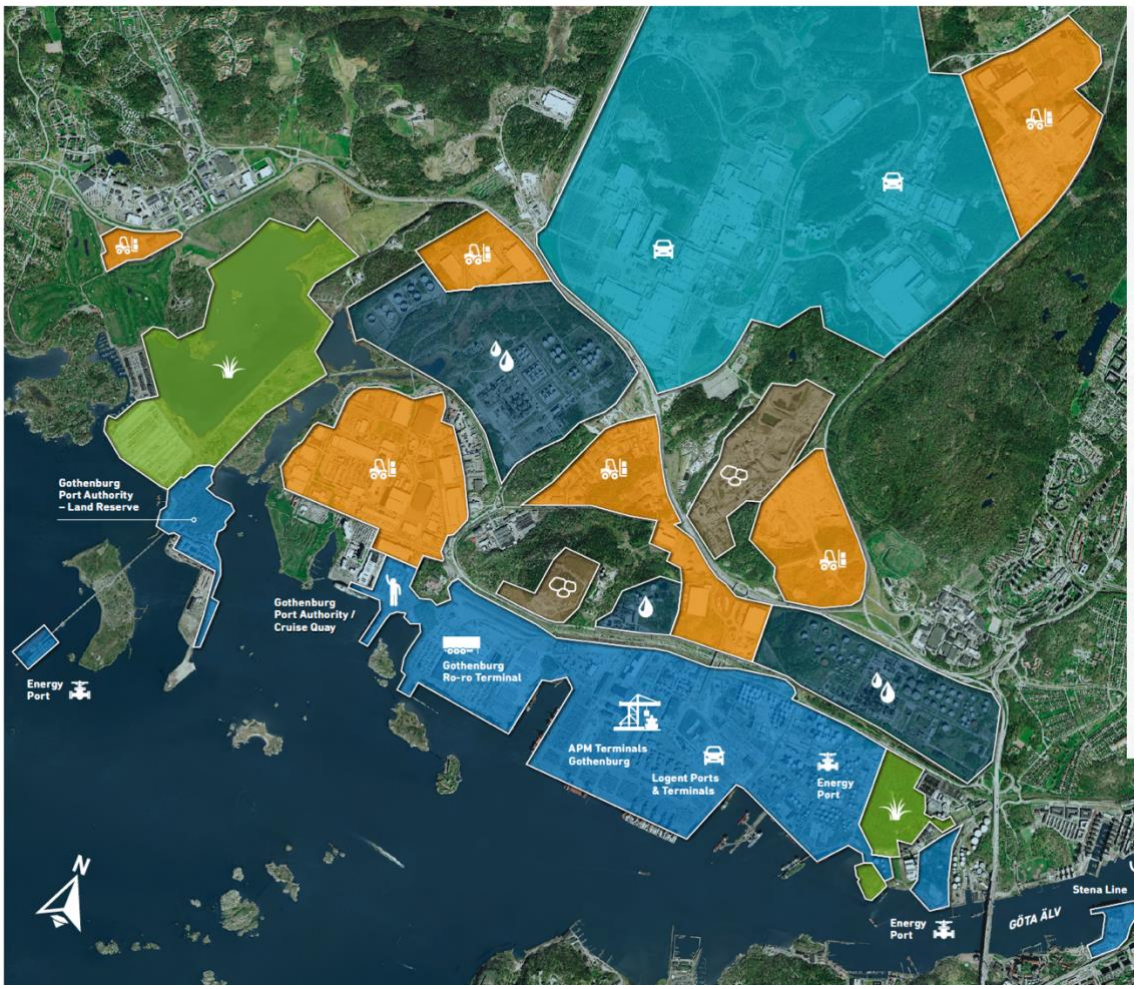


Figure 5 Port of Gothenburg maps (Gothenburg Municipality, 2019)

The Port of Gothenburg freight hub consists of 320 actors and companies (Port of Gothenburg, 2019). The port offers all-around services including storage, preparation, and transshipment, unloading and loading, passenger traffic, and energy product management. There are four terminals in Port of Gothenburg: APM Terminals, Ro-ro Terminal, Logent Port & Terminals, and Stena Line (Port of Gothenburg, 2019). Other than that, Gothenburg Port Authority also manages other land facilities including refineries and Energy Port, logistics area, car clusters, rock quarries, and nature area.

The APM terminal is Scandinavia's largest container port (Port of Gothenburg, 2019). About half all of Sweden's import and export via container is handled in the APM terminal.

The Port of Gothenburg handled 772,000 containers (TEU) in 2019. The Port of Gothenburg has increased its market share from 46% in 2018 to 47% in 2019 (Port of Gothenburg, 2019). Gothenburg Ro-ro Terminal handles all forms of unitized rolling

goods – trailers, cars, and cassettes. The volume of ro-ro unit and car traffics in 2019 Port of Gothenburg is decreased compared to 2018, as the result of the global economic downturn.

The energy usage-related traffic also showing a downturn in 2019, we're showing a total volume of 22.2 million tons in 2019, compared to 23.4 million tons in 2018. Half of Sweden's crude oil import goes via Port of Gothenburg. A different case is with the cruise sector, where the traffic is showing an upward trend in 2019 compared to 2018. This is the result of Port of Gothenburg's commitment to ready to receive any type and size of the cruise ship with two dedicated cruise ship docks and terminal, and also two more quays dock for the largest vessel. The development of volume at the Port of Gothenburg from 2016 to 2019 is shown in Table 3 below.

Table 3 Development of Volumes at the Port of Gothenburg (Port of Gothenburg, 2019)

Variables	**2019**	**2018**	**2017**	**2016**
Number of TEU	772,000	753,000	644,000	798,000
Containers by rail, TEU	456,000	398,000	351,000	447,000
Number of ro-ro units	551,000	584,000	593,000	539,000
Number of new cars	276,000	290,000	295,000	246,000
Energy products, million tones	22.2	23.4	23.5	23.7
Passengers, total	1,784,000	1,680,000	1,733,000	1,708,000
Number of cruise ship calls	59	43	40	34
Number of vessel calls	6,300	6,600	6,600	6,200
The total amount of goods, millions of tones	38.9	40.5	40.8	40.9

Main Incentives Towards Sustainability for Port of Gothenburg

Port of Gothenburg is a profit-oriented company own by Gothenburg Municipality (Port of Gothenburg, 2019). The Gothenburg Municipality adopted "The City of Gothenburg Green Bond Framework" towards sustainability (Gothenburg Municipality, 2019). Green Bond Framework aims towards a low-carbon, climate change-resilient, and ecologically sustainable society. The Green Bond Frameworks excludes the funding for projects involving fossil energy production, nuclear energy generation, weapon and defense, gambling, and tobacco. The Gothenburg Municipality sustainability dimension is shown by Figure 6 below.

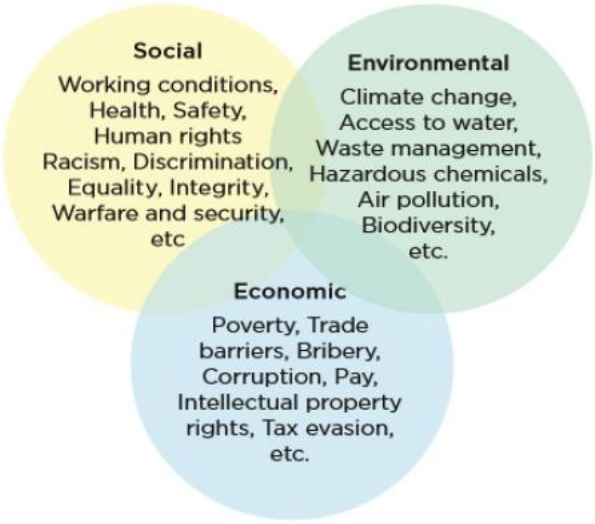


Figure 6 The Gothenburg Municipality sustainability dimensions (Gothenburg Municipality, 2019)

The Gothenburg Port Authority is committed to integrating at least five out of 12 Gothenburg Municipality environmental goals (Varvne & Tselepi, 2018). This commitment includes reducing climate influence, clean air, only natural acidification, toxic-free environment, and living coast and archipelago and coast with the sea in balance. The first action by Port of Gothenburg towards green port started in 1989 when the first installation of the low voltage onshore power supply by Stena Line company (Varvne & Tselepi, 2018). After that, there are many other initiatives implemented in Port of Gothenburg, for example environmentally driven tariff, train intermodal connection, vapor control system, and LNG bunkering operation (Varvne & Tselepi, 2018). There are many driving forces/stakeholders behind Port of Gothenburg's green port initiatives,

including port users, shipping organizations, and regulatory compliance (Varvne & Tselepi, 2018).

Green Port Initiative of Port of Gothenburg

The Port of Gothenburg gives environmental port tariff discount to the vessel that comply with their environmental standard. Port of Gothenburg uses two indexes for vessel performance discount evaluation, Environmental Ship Index (ESI) and Clean Shipping Index (CSI). Vessels that have at least 30 points according to ESI or have at least CSI class 4 receive a 10 percent discount on the port tariff based on GT. Vessels powered by liquefied natural gas (LNG) receive an additional discount of 10 percent. Vessels operated by LNG with a mixture of at least 10 percent liquid biogas (LBG) receive an additional 10 percent discount (Gothenburg Port Authority , 2020).

The Environmental Ship Index (ESI) is the project under the World Ports Sustainability Program (WPSP) founded by the International Association of Ports and Harbors (IAPH) aims to enhance and coordinate future sustainability efforts of ports worldwide and foster international cooperation with partners in the supply chain. The ESI aims to achieve a genuine reduction in emissions of NOx, SOx, and particulates, as well as CO2 in the longer term, to be achieved by initiating changes in behavior among ship owners/operators and ports (Environmental Ship Index, 2020). ESI is a voluntary system showing the performance of a ship. ESI scores NOx and SOx emissions directly and is currently supported by 44 ports in Europe, Asia, Australia, North, and South America.

The Clean Shipping Index (CSI) is an independent reporting and labeling system of the environmental performance of ships and shipping companies (Clean Shipping Index, 2020). CSI uses parameters to identify the emissions, including Carbon Dioxide (CO2), Nitrogen Oxides (NOx), Sulphur Oxides (SOx), particulate matter, chemicals, and water and waste management. CSI offers shipping companies fairways dues by Swedish Maritime Administration (SMA). CSI is a comprehensive method and that can be used by any member of the shipping industry.

Port of Gothenburg Sustainable Initiatives, Target, and Performance in 2019

The Gothenburg Port Authority published its first sustainability report in 2012 and started to follow the GRI G4 guidelines in 2015 (Gothenburg Port Authority, 2015). Although

Port of Gothenburg is self-financed, the mission is decided by the city council since it is structured under the parent company, Stadhuis AB (Port of Gothenburg, 2019).

The company submits the new ownership directive in 2017 related to sustainable development in all, including:

1. Responsible building.
2. Owning and managing/ renting logistics properties for port-related operations.
3. Provide berths for cruise ships, thereby contributing to the development of tourism in the city.
4. Work to develop systems to reduce local environmental impact from heavy traffic to and from the port.

The Port of Gothenburg business plan for 2019 focused on five areas: market and customer, process development for increased efficiency, employees and society, environment, and finance (Port of Gothenburg, 2019). These five goals are measured to bring the new vision, mission, and target which are reevaluated for the 2020 business plan. The prioritized initiatives of the Port of Gothenburg business plan in 2019 are shown by Table 4 below.

Table 4 Port of Gothenburg prioritized initiatives of Port of Gothenburg business plan in 2019 (Port of Gothenburg, 2019)

Goals	Initiatives
Market and Customer	• Carry out prioritized activities to improve • Customer Satisfaction Index. • Establish a clear strategy for the company's brand and external communication. • Develop a digitalization strategy to strengthen the company's business and the cluster's success.
Process Development	• Clarify roles for projects and information/ document management. • Competence development in document management. • Ensure the use of the agreed methodology "continuous improvements" in-process work (PDCA). • Improve working methods for customer and contract management. • Introduce project management methodology (PPS).
Employees and Strategy	• Develop a strategy to strengthen the company as an attractive employer and produce measurement figures for 2019. • Intensify and systematize collaboration with academia. • Work on equal treatment to meet demands from the city and strengthen the company's values. • Establish routines for information security. • Strengthen our systematic work on working conditions, increase prevention work and measure the current situation. • Work to safeguard a culture of safety, through values and knowledge.
Environment	• Coordinate and ensure that the environmental plan includes adequate measures to achieve the objectives.

Goals	Initiatives
	• Evaluate the goals and ensure activities are being implemented that contribute to reducing local environmental impact from heavy traffic to and from the port.
Finance	Develop financial management systems for improved and simplified financial management with a focus on profitable business and long-term sustainable economic development.

The prioritized initiative of Port of Gothenburg in 2019 was then translated into the measurable target to be reviewed annually. Port of Gothenburg's performance in 2019 overall is a mixed combination of not reaching the target, almost reaching the target, and reaching the target (Port of Gothenburg, 2019). The Port of Gothenburg initiatives target and result in 2019 is shown in Table 5 below.

Table 5 Port of Gothenburg initiatives targets and results in 2019 (Port of Gothenburg, 2019)

TARGET		**RESULT 2019**	
Finance Goal			
Minimum return on fixed assets	7%	7%	Reached target
Minimum operating profit	SEK 200m	SEK 189m	Not reached target
Minimum equity ratio	35%	55.2%	Reached target
Market and Customer Goal			
Customer Satisfaction Index (CSI)	65	68	Reached target
Process Development Goal			
Process Maturity Level	8	8* (several, not all)	Almost reached target
Employees experience the management system to be user-friendly	75%	postponed	Almost reached target
Project maturity level according to a general maturity analysis	3	Increased	Target reached
Employees and Strategy Goal			
Attractive employer	Various	Various	Target reached
Have a good, safe, and developing a work environment	Various	Various	Almost reached target
Environment Goal			
Reduced climate impact	Various	Various	Not reached target
Reduced local environmental impact	Various	Various	Not reached target
Reduced use of resources	Various	Various	Not reached target

The Tanjung Priok Port

The Tanjung Priok Port is the biggest in Indonesia, located in North Jakarta bay of Jakarta Province, Indonesia's capital. The port is being operated by a state-owned enterprise, PT Pelindo II (Persero) / Indonesia Port Corporation (IPC). The Indonesia ports are regulated under the Ministry of Transportation, under the General Directorate of Sea Transportation. The Ministry of Transportation has functioned within policies establishment and implementation, norms, standards, procedures and criteria establishment; technical guidance and evaluation implementation; and administration in Indonesian sea transport (Presiden Republik Indonesia, 2015).

Ecoport Concept

The Port Authority in Indonesia is Otoritas Pelabuhan (OP), a technical implementation unit under the Ministry of Transportation (Menteri Perhubungan Republik Indonesia, 2012).

The Otoritas Pelabuhan (OP) / Port Authority of Tanjung Priok Port adopts the concept of Ecoport that has been implemented worldwide as their method on port sustainability approach (Otoritas Pelabuhan Utama Tanjung Priok, 2020). Tanjung Priok Port has 15 turning basins, 6 breakwaters, 14 piers, one warehouse, one conventional stockyard, container yard, and various loading unloading equipment (Kementerian Perhubungan Republik Indonesia, 2012). The location of Tanjung Priok Port is shown by Figure 7 the layout of Tanjung Priok Port is shown by Figure 8 below.

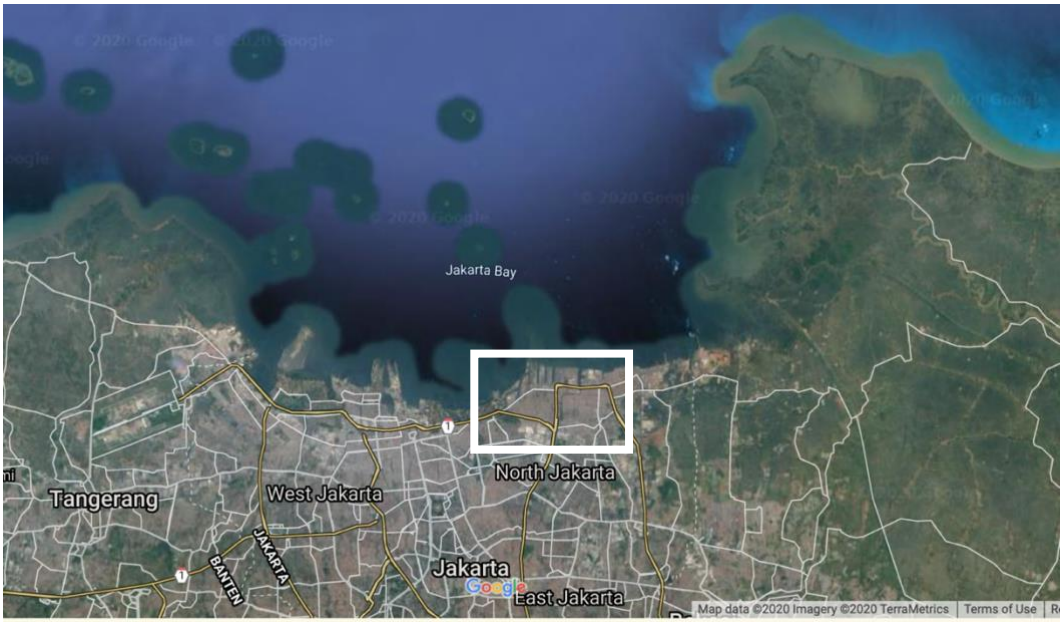


Figure 7 Location of Tanjung Priok Port (Google Maps, 2019)

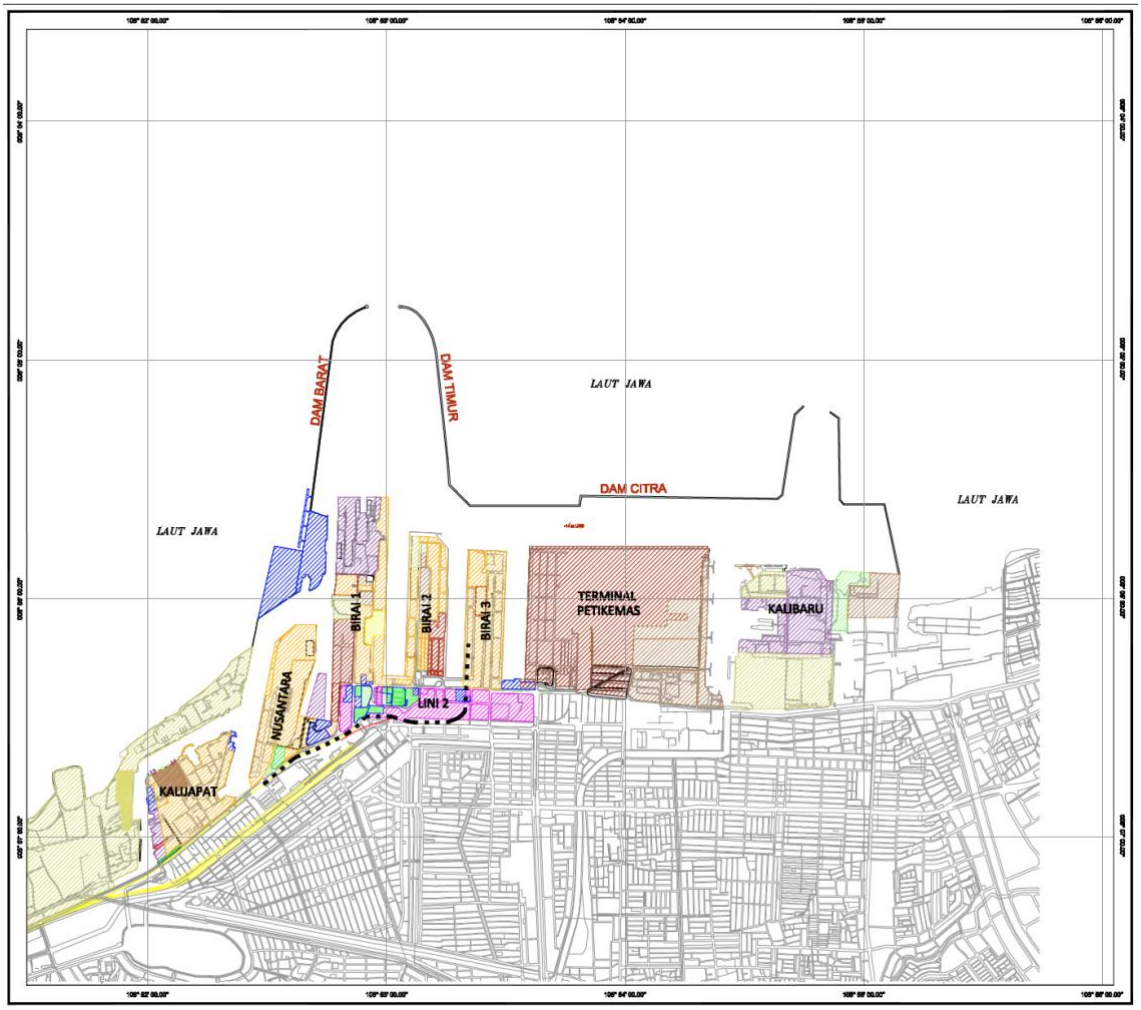


Figure 8 Tanjung Priok Port layout (Kementerian Perhubungan Republik Indonesia, 2012)

The Ecoport concept adaptation by Tanjung Priok Port Authority has the company vision as the foundation with four pillars, a beam of Ecoport manual, and the Ecoport programs as the top roof. As illustrated in Figure 9 below, the vision is to realize the Tanjung Priok Port as the pioneer in environmental operational and management in South East Asia (ASEAN). While the 4 (four) pillars: regulatory compliance, environmental management system, green initiatives, and stakeholder's involvement (Otoritas Pelabuhan Utama Tanjung Priok, 2020). The regulatory compliance covers the fulfillment of all regulatory requirements in the environmental sector, including environment impact regulation, water pollution control, air pollution control, and hazardous waste treatment. An example of the environmental management system used is ISO 14001. Green initiatives of Tanjung Priok Port Authority cover energy, water providence, environmentally friendly technology and

material, and habitat and biodiversity protection. The original pillars of Ecoport concept by Tanjung Priok port is shown by Figure 9 below.

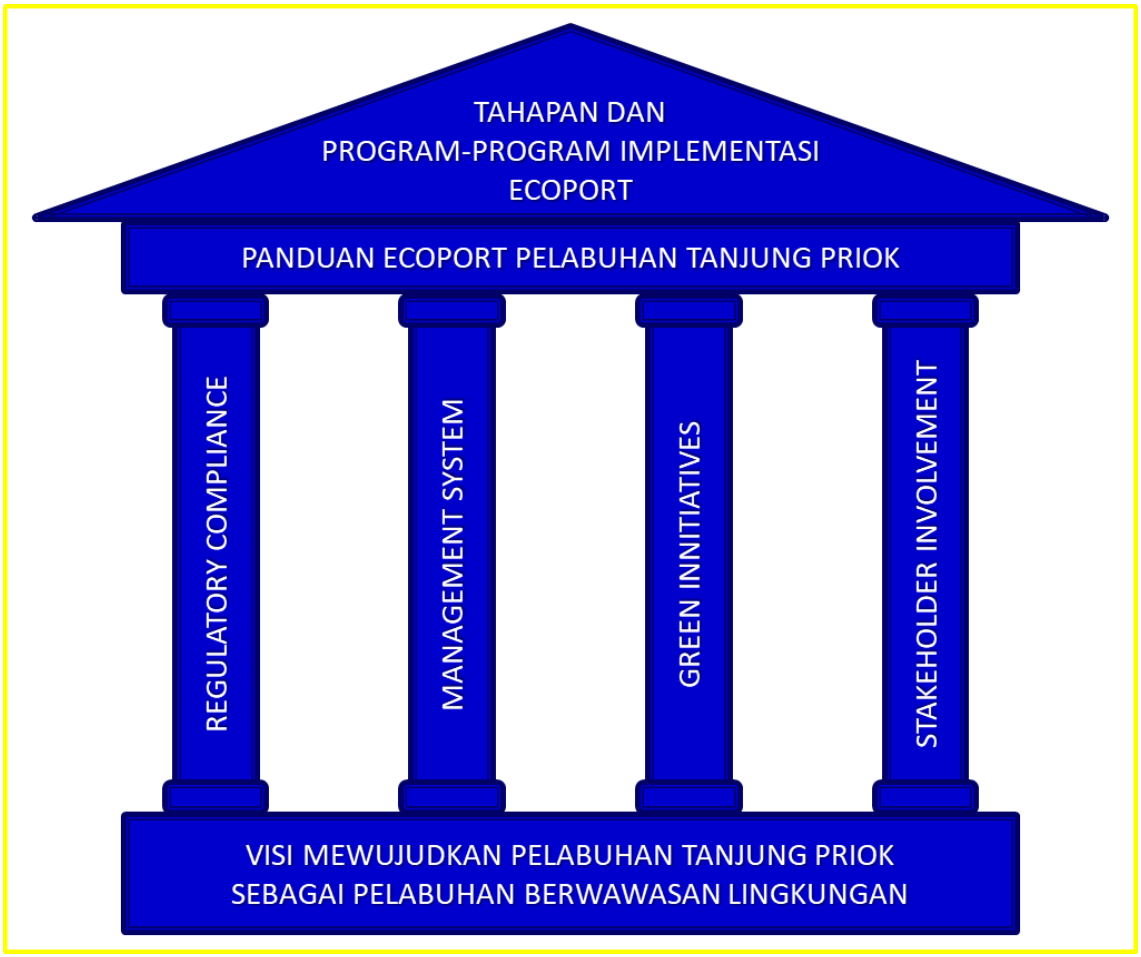


Figure 9 The original four pillars of Ecoport by Tanjung Priok Port Authority (Otoritas Pelabuhan Utama Tanjung Priok, 2020)

Existing Condition of Ecoport Concept

The existing condition of the Ecoport concept of Tanjung Priok Port is based on data published by the Ministry of Transportation on Focus Group Discussion (FGD) in 2019 (Otoritas Pelabuhan Utama Tanjung Priok, 2019). The existing condition is based on the report from Tanjung Priok Port Authority in 2019, including:

1. Air and dust particle management.
2. Water quality.
3. Ship and port waste management.
4. Energy and climate management.

5. Reclamation, port development, and operational.
6. Bunkering, hazardous cargo, and contaminated land.
7. Traffic and noise.
8. Local communities' relationship.
9. Ecosystem management

These nine aspects were introduced by Tanjung Priok Port Authority to comply with the international Ecoport practice and PIANC guidelines. The current condition of these nine aspects is described below.

Air and dust particle management

The current emission source in Tanjung Priok Port is shipping with diesel engines, port operational equipment that is mostly with diesel engines, trucks, and trains with diesel engines, and land transport with a diesel engine. When the ships are onshore, all ships use their generator for electricity, which is mostly diesel engines. The emission including SO_x, NO_x, HC, CO_2, and Particulate Matter (PM). There is no dust collector in the dry general cargo terminal. The procedure of using nets to catch fugitive emissions is only for dry bulk cargo unloading. The odor management also still not functioning in the port area.

Water quality

Three river flows carry domestic waste from the housing and offices to the port area, Kali Japan, Kali Kresek, and Kali Longa. Some criteria exceed the safe limit including oil layers, coliform pollution, and ammonia level. There are attempted to clean the water with trash trapping vessels, but motivating people to stop throwing waste into the river is still an ongoing work. Other concerns are water consumption management and water quality monitoring both for sea and freshwater.

Ship and port waste management

There are many Reception Facilities (RF) available in Tanjung Priok port including two tugboats, three liquid waste barges, a 25 m^3 waste reception tank, a separator pump, two portable pumps, and a 200-meter oil boom. But the new RF system is not working properly yet, for example, ships still handing oil sludge waste without Tanjung Priok Port

Authority approval. Solid waste from the dock and workshop is not managed properly. Same condition to the poorly managed garbage shelter.

Energy and climate management

There are operational activities with the potential of energy-wasting of low-performance equipment, inefficient loading and unloading system, congestion inside and outside the port, unavailability of capacitor bank for crane, the traditional buildings without green building adaptation, and non-LED lighting system. The biggest current energy issue in Tanjung Priok Port is the sole usage of nonrenewable electricity. Indonesia electricity is still mostly contributed by fossil fuel (50% from coal, 29% from natural gas) and only 14% is from a renewable source (Secretariat General National Energy Council, 2019).

Reclamation, port development, and operational

There is no available land area for port development for Tanjung Priok Port, so the development is pushed to the deck on pile structure and reclamation. There is a need to redefine the port zonation according to the new development plan. The reclamation included for port development plan needs for new land.

Bunkering, hazardous cargo, and contaminated land

There is evidence of contaminated land on the CPO terminal, workshop, and dock. There is never been a land quality assessment conducted to see the effect of contaminated land in Tanjung Priok Port before.

Traffic and noise

The current condition of the port traffic is with the high possibility of a traffic accident because of the highspeed truck, mixed traffic, long queue of the port entrance, and lack of buffer zones. The monitored noise level is at 60-75 dB, with a limit of 70 db. The noise sources are the land vehicles, port operational equipment, loading and unloading activities, and vessel engines.

Ecosystem management

The vast development of Jakarta City and Tanjung Priok Port from their 100 years of development has caused the negative impact of biodiversity in Kepulauan Seribu, the islands at the north of Jakarta City. The needs of wastewater treatment systems are urged to save the bigger problem that might be caused. Tanjung Priok Port Authority is motivated to take action to keep the marine diversity in the port area.

Local communities' relationship

The main concern of local communities for Tanjung Priok Port is three rivers are flowing to the port area bringing the sediment and material from the dense housing. The engagement with local communities would help Tanjung Priok Port to maintain the port performance and facilities in the longer run.

Financial Parameter

Port Authority of Tanjung Priok Port is a government body that is not working based on financial benefit for a commercial port. The operational and commercial side of the port is handled by PT Pelindo II (Persero) / IPC under Port Authority regulation. Currently, the Port Authority of Tanjung Priok Port does not publish any report regarding financial performance.

3 Methodology

3.1 Research Method

The study conducted using qualitative case study research. Data will be collected through multiple sources of information, such as in-depth semi-structured interviews and company internal report and documents method (Brinkmann, 2013). The collected documents and literature review may support the same findings to strengthen the facts and complement each other (Creswell, 2013). The data collected will be analyzed by empirical thinking, along with sufficient presentation of evidence and careful consideration of alternative interpretations (Yin, 2018).

To evaluate the sustainability approach of Port of Gothenburg, the study will perform academic sustainability measurement with the Sustainable Balanced Scorecard (SBSC). This method is the most suitable academic measurement port business other compared to other method reviewed: Triple Bottom Line (TBL) and Total Responsibility Management (TBM). The Port of Gothenburg performance in sustainability from 2015 to 2019 will be translated into the SBSC model by Sislian and Jaegler (2018). Then, the review of the Port of Gothenburg approach towards sustainability is used as the best practice.

The study on Tanjung Priok Port of Indonesia will be conducted with Gap Analysis. A Gap Analysis shows the current performance of the business with its desired goal (Kenton, 2019). The current condition of Tanjung Priok Port towards sustainability will be compared to the best practice and sustainability vision of the company. The Gap Analysis includes four major steps including current state identification, future state identification, gap identification, and lastly, is how to fill in the gap (Leconte, n.d.) (Wirth, 2004). The research methodology of this study is shown by Figure 10 below.

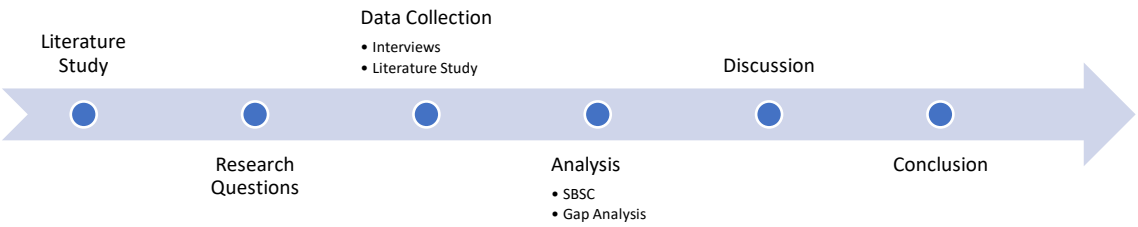


Figure 10 Research methodology

3.2 Unit of Analysis

The unit of analysis is the object from which the researcher collects data (Kumar, 2018). The unit of analysis is the answer of the who and what is included in the research. In this research, the units of analysis are on the organization level. The units of analysis in this study are Port of Gothenburg and Tanjung Priok Port. The relevance of research questions and unit of analysis is shown in Table 6 below.

Table 6 Research Questions and Unit of Analysis

No	Research Questions	Unit of Analysis
1	How a sustainable port practices its sustainability work?	The Port of Gothenburg
2	How do practices of a sustainable port compare to academic assessment on sustainability?	The Port of Gothenburg
3	What are the gaps in the Indonesian Port approach to sustainability?	Tanjung Priok Port
4	What are the useful tools that can help the Indonesian port to fill the gap?	Tanjung Priok Port

3.3 Research Quality

There are four elements of research quality: reliability, validity, sampling, and generalizability (Coolingridge & Gantt, 2008). Reliability seemed to be accepted as adopting a method that is widely adopted by the community. By using a proper method of research, the expected result of a qualitative study is good consistent quality, rather than expecting the same result with the previous study. Thus, the result of the study may differ from the theories mentioned. The differences in results are considered as the researcher's subjective understanding of the study subject complexity (Giacomini MK, 2000). The data of this study are analyzed with an unbiased perception of theories. The interviewees in this study are the people responsible for the sustainability movement both on Port of Gothenburg and Tanjung Priok Port. The credibility of the interviewees extends to the credibility of this study.

Validity measures the tools that could provide the requirement for the interest (Coolingridge & Gantt, 2008). It also shows the relationship between the tools used and previous study measurements. There is a similarity between qualitative and quantitative invalidity matter. Both studies must provide a legitimate result with a method that

coherent, justifiable, and in a rigorous manner (Coolingridge & Gantt, 2008). This study is conducted in a good manner, data collected are legitimate, and following the previous similar study conducted before.

Sampling is used in the quantitative study to apply random selection, while the samples in the qualitative study are considered in the same qualification. The sampling in the qualitative study must fulfill the specific role and purpose in the study (Coolingridge & Gantt, 2008). The consideration in sample selection in the qualitative study is experience, importance, and capability. Thus, the sampling method in a qualitative study is different in quantitative but considered fit to the application. The sampling process in this study fulfilled the requirement of good sampling by conducted with formal representatives of the companies.

Generalizability results in a qualitative study are still in the discussion because of the non-random sampling and specialization (Kvale, 1994). But analytical generalization could be applied where the researcher could differentiate the similarities and differences from the previous study to the extended condition. The biggest challenges in qualitative study generalization are coherent study framework and well-executed results (Coolingridge & Gantt, 2008). The result of this study is coherent with the current condition of Port of Gothenburg and Tanjung Priok Port. A further study to compare the result of this study to the extended condition is required for analytical generalization.

4 Results

The results section consists of three parts: the sustainable port practice of Port of Gothenburg, Sustainable Balanced Scorecard (SBSC) of Port of Gothenburg, and Gap Analysis on Indonesian Port sustainability approach. The first part is the result of the interview with Edvard Molitor, the sustainability manager of Port of Gothenburg. The second part is the result of Port of Gothenburg's annual sustainability reports from 2015 to 2019. The last part is the result of the data collected from the Indonesian Ministry of Transportation.

4.1 The Sustainable Port Practice of Port of Gothenburg

The sustainability focus of Port of Gothenburg is the environmental issue. Port has its own environmental goals. Port specific environmental goal is based on the City of Gothenburg's environmental program in 2009. The City of Gothenburg's environmental goals is based on the Swedish National Environmental Goals in the 1990s. Sweden as a nation has 16 goals. The city of Gothenburg brought 12 out of 16 national environmental programs.

The UN SDGs from 2015 was adopted in the Swedish's National Goals. The committee that responsible for Sweden's national goals was involved in UN SDGs preparation. So, the UN SDGs and Swedish National Environmental are conjunctive. From 2016-2019, the port does not work with national-regional procedures anymore, but instead the port works directly towards UN SDGs. One of the examples is reporting that is based on UN SDGs. The chosen goals are the ones that relevant to the port business and the current work conducted by the Port.

The port works with almost all the UN SDG, except are Goal 2: Poverty and Hunger, and Goal 9: Build resilient infrastructure. The goals choosing criteria are by listing the 169 targets of UN SDGs and check the relevance to the port. Even though the Goal is likely relevant to the port, but when the targets are not, then the Port of Gothenburg exempts the goal. Goal 9 will be included in the next Port of Gothenburg annual sustainability report. The port creates value and footprint in sustainability aspects. The port helps to fulfill certain Goals forward but also weighting others. For example, the port helps to develop the cities (Goal 11) but on the other hand, the port also emits CO_2 (Goal 13). The UN SDGs are interconnected to each other, where some goals can be improved while putting

weight on the others. The Port works are limited to the City of Gothenburg's, since the port is owned by the city, especially on a social aspect.

The Environmental Aspect

The movement starts with the environmental permit to operate. The permit is based on the number of legal clauses. The environmental issues are extended to sustainability since it is also public health effects. Fulfilling the law is the basis. Port of Gothenburg has an environmental program further than required. ISO Standardized both on environmental impact, work ethics, general quality, 14001 already complied in the 90s. By following the required global and local law, the port is fulfilling the environmental and social aspects.

The Port of Gothenburg also actively providing Onshore Power Supply (OPS) where the vessel can get electricity while berthing since 1989. The electricity is provided by the Gothenburg Municipality. The Port of Gothenburg uses the environmental index ESI together with fifty other ports in the world. The Index limits the maximum numbers of funds available and vessels in the discount system. By doing so, the port reduced the financial risk and put an obligation to the vessel operator to make sure their fleet is always on the list.

The Social Aspect

The port helps to employ 22,000 people within 320 companies in the Port of Gothenburg. 8,000 people are working directly with in Gothenburg and 14,000 indirectly working in the port area. There are many actors and companies involve with the port, so the port has a part in the social aspect, especially creating jobs.

According to Edvard Molitor (Molitor, 2020), the port complies with Corporate Social Responsibility (CSR) in the social aspect. The port works with a third party to help the needs with their CSR program. The port also contributes directly to the communities, for example providing food during office hours. But He considers direct CSR actions that irrelevant to the port business are less effective. For example, planting trees in third countries (Green Washing) and serving meals during work hours for the needs are not the core of the port's business. He thinks that by excelling in the port business and

contributing as much as they can to the city, the port can help the experts to achieve a bigger goal. The ports also committed works to keep providing decent jobs.

There are achievements that the port has been done in the social aspect. For example, ten years ago the truck entry did not facilitate the truck drivers before entering the port. There were no toilets, cafeteria, showers, and other public facilities. The drivers were locked in their trucks. Then the port worked to shorten the queue, better entrance, and provide the public facilities to help the truck driver during the waiting time.

The port's initiatives extend to the vessels. The port gives incentives to the greener vessels. The vessels would get a discount in port fees and seaway passage if they perform better in the environmental aspect. The port also extends the initiative to the social aspect on board. The port would give discounts to the vessel that provides a good working environment onboard.

The Drivers and Stakeholders

The main driver for Port of Gothenburg towards sustainability is the Gothenburg Municipality. The Municipality has specifically given the Port of Gothenburg the role and funding for the task. If the port were owned by a private company, the port would not have contributed as much as they are now in sustainability. Many of the initiatives are rely on the Gothenburg Municipality capacity to help Port of Gothenburg achieve the sustainability goal. For example, the Onshore Power Supply (OPS) is made possible because the city's electricity is green and clean. The ownership of the city is the biggest factor in the movement.

The second factor is the good income of the port. Many vessels visit the Port of Gothenburg and bring revenue to the port. It is easier to work on sustainability issues when there are available resources. But it is not impossible to find the balance of revenue orientation and sustainability effort with the discount system. The method is by Bonus System, where the extra charge on the less environmentally friendly vessel and the fund goes to the vessel that performs better. Unfortunately, the system is still ineffective. Although the port has no risk in the scheme (zero-sum), there is the risk of a greener vessel does not gain the required amount to operate better. Another method that is used by Port of Gothenburg is by only gives a discount to the better performing vessel without the additional charge to the less environmentally friendly vessel. The alternate scheme

puts the financial risk to the port, but it is more acceptable to the actors to perform better. The Port of Gothenburg managed to apply the scheme with the support of Gothenburg Municipality in financial risk.

There are many actors behind the sustainability movement in the Port of Gothenburg. The Gothenburg Municipality is the biggest contributor. The vessel operator is actively promoted towards cleaner sea transport along with trucking companies. Terminal operators also contributed to the movement. For example, The APM Terminal launched a new program: Green Gothenburg Gateway. The initiative lowers the CO_2 footprint by 30-60%, which is in line with the Port of Gothenburg program. The port also works with other terminal operators through the lease contract agreement. There is a specific environmental board that works together with the stakeholders. The Port of Gothenburg starts promoting sustainability to the port actors by becoming the role model and inspire others.

The Green and Sustainable Port

According to Edvard, the Port of Gothenburg is considered a sustainable port rather than a green port (Molitor, 2020). The term sustainable port is also still in discussion since there are not widely approved criteria to be a sustainable port. The Port of Gothenburg was one of the most sustainable ports in the world six years ago but currently, it is hard to claim it today. The current movement of sustainability is very fast and impossible to predict how the industry will move with the effort.

The sustainable port is described in many ways in the maritime industry. While Green Port concept is a port that leaves no footprint at all. It is still impossible to achieve with the port business model, where there will be always climate and environmental effects by the port. Meanwhile, the idea of sustainability is by making sure to do the best practice of the current situation and preparing the business for the future.

The Strategies

Many of the current Port of Gothenburg's sustainability initiatives were not originally meant to solve sustainability issues. For example, inland transportation relies on efficiency. Rails transportation with trains is more efficient than the roads. The dry port system (The Rail Ports Scandinavia) was introduced 20 years ago to ensure seamless

traffic. The rail's transportation share is 60% compared to the road transport of 40% in the Port of Gothenburg. These environment initiatives are originally meant to get more traffic.

The dry port connects the middle part of Sweden to the Port of Gothenburg; thus, the port could get all national traffic. The dry port systems provide more traffic and goods transported. The empty cargo is reduced significantly, the almost same percentage of import and export. The best of Port of Gothenburg's effort in reducing footprint is to have an efficient system. It is important to understand that to have a sustainable port, it is required to investigate outside the port. The entire transport chain must work efficiently to achieve a good system.

The feeder ports system is not suitable for Sweden's geography. The Port of Gothenburg considers that more stops (unloading and offloading) equal to more time, environmental footprint, and cost. Reducing transported goods modes transfer is one of the priorities of Port of Gothenburg to ensure efficiency. It is easier to regulate inland transport than vessels. The port is the only point where the regulators could lock the regulation both for vessels and inland traffics.

Other countries may be more suitable for the feeder ports system due to their geography. For example, the Port of Rotterdam relies on inland barging and has less rail transport compared to Sweden. The economical aspect of a feeder port is hard to achieve. It is much simpler and cheaper to use rail transport instead. The rail transport system in Sweden is adequate to support current port traffic and the future. For a more archipelagic nation, the Ro-ro vessel would be the solution for transporting goods.

The port does not have a specific sustainability strategies plan published. But the port has an environmental plan that addressing issues that are being worked on. The port considers sustainability as an issue that has to embrace rigorously. The sustainability strategies are implemented in the company’s main strategies.

The Cost and Benefits

The port is considered to gain profit with an overall sustainability approach. It is because when the Port of Gothenburg started addressing the sustainability issue, there was large interest from international stakeholders. By being a sustainable port and proactive promoting sustainability, the Port of Gothenburg has become well known. The Port of

Gothenburg is the biggest in Sweden, it is not the top ten biggest port in Europe and not the top 100 in the world. But, when it comes to the sustainable port, Port of Gothenburg is one of the most respectable. The position is the reason why the benefit of being sustainable overcomes the costs for the Port of Gothenburg.

The initiatives are done by the Port of Gothenburg towards sustainability, for example, Onshore Power Supply is considered as an investment. The port will get Return on Investment (ROI) on the infrastructure in time. The port was also supported by the municipality by removing the tax on electricity in OPS.

Reporting and Measurement

There are various measurements available to measure sustainability depends on the aspects, but mainly focusing on environmental issues. The Port of Gothenburg chose to use ESI (Environmental Shipping Index) and CSI (Clean Ship Index) in Gothenburg. Both indexes used to give vessels incentives to use cleaner fuel and install new technology.

The Port of Gothenburg works with ESPO (European Seaport Organization) with other ports in European Union. The ESPO's concept is Ecoport, which is similar to ISO 14000. The ESPO Ecoport's level of port sustainability including grade and description. Then the report could be used to compare one port performance to another. The system also provides Port Environmental Review System (PERS) certification.

Global Reporting Initiative (GRI) standards are used by the Port of Gothenburg to report the sustainability effort. The GRI is widely used by other industries but unfortunately, there is no port-specific report available yet. The GRI allows Port of Gothenburg to communicate with the public. It is hard to compare one port to another since it is based on the business model of the port. For example, Port of Rotterdam includes all the industries within the port clusters while Port of Gothenburg excluded the refinery from the reporting.

4.2 The Sustainable Balanced Scorecard (SBSC) of Port of Gothenburg

The assessment of Port of Gothenburg using SBSC is based on the original four perspectives with replacement of Innovation and workers learning target with Environmental Perspective. The five years result (2015-2019) of Port of Gothenburg's business model performance is modeled to see the increase or decrease of performance and analyze the correlation between each perspective. The SBSC model of Port of Gothenburg is shown in Figure 11 below.

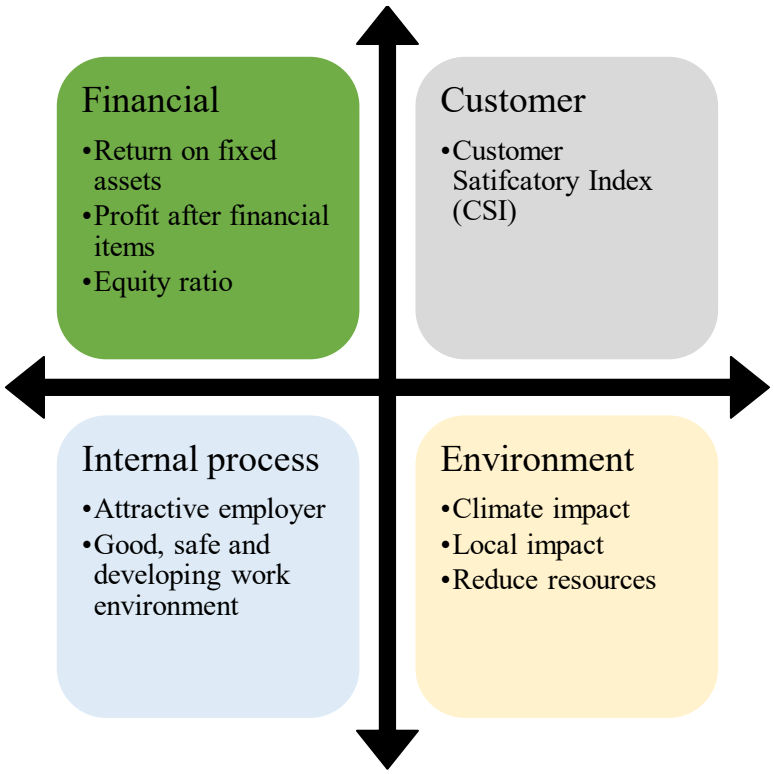


Figure 11 The SBSC model of Port of Gothenburg.

Perspectives Performance of Port of Gothenburg

Financial Perspective

The Financial perspective represents the financial target of Port of Gothenburg's 2019 business plan. The port's strategy from a financial perspective is to develop financial management systems for improved and simplified financial management with a focus on profitable business and long-term sustainable economic development (Port of Gothenburg, 2018).

The perspective has three targets: return on fixed assets, profit after financial items, and equity ratio. The return on fixed assets of Port of Gothenburg in 2019 reached 7.2%,

higher than the target of 7.0%, although it is lower than the 2018 result of 8.7 % and 2017 result of 8.2%. The profit after financial items in 2019 resulting 189 million SEK, slightly under the target of 200 million SEK and lower than the 2018 result of 245 million SEK and 2917 result of 214 million SEK. The result of the financial perspective of Port of Gothenburg is shown at Table 7 below.

Table 7 Result for Financial Perspective of Port of Gothenburg.

GRI No	Goals	Measures	Increase / Decrease 2017-2018	Increase / Decrease 2018-2019
102-7	Return on fixed assets	Percentage	4%	-17%
201-1	Profit after financial items	SEK million	14%	-23%
o.d.	Equity ratio	Percentage	9%	4%

Customer Perspective

Customer perspective indicated with the Market and Customer target in Port of Gothenburg's business plan. The strategies regarding customers are to carry out prioritized activities to improve the Customer Satisfaction Index, establish a clear strategy for the company's brand and external communication, and develop a digitalization strategy to strengthen the company's business and the cluster's success.

The measurement of customer perspective is the Customer Satisfactory Index (CSI) which is a once in two years survey conducted by Port of Gothenburg. The target is to have a Customer Satisfaction Index (CSI) of at least 65 in 2019, where Port of Gothenburg result is 68, a significant growth from 2017's CSI of 49. Port of Gothenburg CSI results in 2019 are the highest from 2016. The result for customer perspective performance of Port of Gothenburg is shown by Table 8 below.

Table 8 Result for Customer Perspective of Port of Gothenburg.

GRI No	Goals	Measures	Increase / Decrease 2018-2019*	Increase / Decrease 2017-2018
102-43 102-44	Customer Satisfaction Index (CSI)	CSI	39%	-22%

*2018 CSI is using CSI of 2017 = 49.

Internal Process

The internal process perspective represents the employee and society goal of Port of Gothenburg. The strategies for Internal Process are:

1. Develop a strategy to strengthen the company as an attractive employer and produce measurement figures for 2019.
2. Intensify and systematize collaboration with academia.
3. Work on equal treatment to meet demands from the city and strengthen the company's values.
4. Establish routines for information security.
5. Strengthen our systematic work on working conditions, increase prevention work and measure the current situation.
6. Work to safeguard a culture of safety, through values and knowledge.

There are two goals included, attractive employer and a good, safe, and developing working environment. Port of Gothenburg reached the goal for the attractive employers with the increase of development from 2018 to 2019 in overall criteria and keeping the good result of a good, safe, and developing work environment as the same result with previous years. The result for the internal process perspective performance of Port of Gothenburg is shown by

Table 9 below.

Table 9 Result for Internal Process Perspective indicators of Port of Gothenburg.

GRI No	Goals	Measures	Increase / Decrease 2017-2018	Increase / Decrease 2018-2019
	Attractive employer			
o.d.	Employee turnover	Percentage	-54.5%	44.6%
401-2	Employee Benefits:			
	Health profile assessment*	person	0%	4%
	Wellness Contribution	person	-30%	6%
	Sponsorship of sports event starting fees	per	-53%	-13%
o.d.	Sustainable Employee Engagement Index	percentage	0%	-5%
	Have a good, safe, and developing a work environment			
od	Total sick leave	percentage	-11.1%	-15.0%
404-3	Share of employees receiving regular performance reviews	percentage	0.0%	0.0%
405-2	Condition for basic pay and remunerations	percentage	0.0%	0.0%
406-1	Cases of discrimination and measures taken	number	0.0%	0.0%

Environmental Perspective

The additional environment perspective reflects an environment target as part of the Port of Gothenburg business plan. The strategies regarding environmental perspective are:

1. Coordinate and ensure that the environmental plan includes adequate measures to achieve the objectives,
2. Evaluate the goals and ensure activities are being implemented that contribute to reducing local environmental impact from heavy traffic to and from the port.

The target has three major goals including reduced climate impact, reduced local environmental impact, and reduced use of resources. An overall result showing that Port of Gothenburg has decreased development on Environmental target between 2018-2019 compared to 2017-2018. The result for the environmental performance of Port of Gothenburg is shown by

Table 10 below.

Table 10 Result for Environment Perspective of Port of Gothenburg.

GRI No	Goals	Measures	Increase / Decrease 2017-2018	Increase / Decrease 2018-2019
	Reduced climate impact			
305-1	Gothenburg Port Authority's total emission of GHG	Direct tons of carbon dioxide equivalents	9%	-3%
305-2	Gothenburg Port Authority's total emission of GHG	indirect energy, tones of carbon dioxide equivalents	-43%	5%
305-3	The Port of Gothenburg's emissions of GHG	other indirect, tones of carbon dioxide equivalents	-5%	4%
305-1, 305-2, 305-3	Gothenburg Port Authority's total emissions of GHG	tons of carbon dioxide equivalents	0%	7%
	Reduced local environmental impact			
305-7	Sulfur dioxide	tones	-10%	1%
305-7	Nitrogen dioxide	tones	-14%	0%
305-7	Particles	tones	-9%	5%
305-3	Carbon dioxide	tones	-11%	-89%
305-7	Hydrocarbons	tones	-7%	8%
	VOC emissions in the Energy Port	tones	0%	-13%
	Reduced use of resources			
203-1	Energy	million tones	-1%	-6%
306-2	Energy recovery	percentage	-2%	9%
	Recycling	percentage	-14%	-26%
	Sorting	percentage	19%	0%

Perspectives Performance Correlation

To be able to map all the perspectives of Port of Gothenburg, a coding naming system is needed. By showing a perspective performance by year to year (YOY) it is possible to present the data with the same value of percentage performance, rather than have multiple units for different perspective performance.

Financial perspective represents with F code with three sub perspective, Return on fixed assets (F1), Profit after financial items (F2), and Equity ratio (F3). Customer perspectives represent code C, showing the year-to-year Customer Satisfaction Index differences. Internal perspective represents with S code, with two sub perspectives, S1 for Attractive employer which the average of Health profile assessment, Wellness Contribution, Sponsorship of sports event starting fees, and Sustainable Employee Engagement Index. While the sub perspective of Have a good, safe, and developing work environment represents with S2 code showing the average of Total sick leave, the share of employees receiving regular performance reviews, Condition for basic pay and remunerations between women and men, and Cases of discrimination and measures are taken. Environment perspectives represent the E code with three sub perspectives. E1 code represents the Reduced climate impact sub perspective that showing Gothenburg Port Authority's total emissions of GHG. E2 code represents Reduced local environmental impact that showing the average performance of Sulphur dioxide, Nitrogen dioxide, Particles, Carbon dioxide, Hydrocarbons, and VOC emissions in the Energy Port. E3 code represents the sub perspective of Reduced use of resources that showing performances of Energy, Energy Recovery, Recycling, and Sorting. The code and total performance of Port of Gothenburg performance from 2015 to 2019 are shown by Table 11 below.

Table 11 Perspectives performance of Port of Gothenburg

CODE	GOALS	2015-2016	2016-2017	2017-2018	2018-2019
FINANCIAL PERSPECTIVE					
F1	Return on fixed assets	-1.10%	-6.67%	3.57%	-17.24%
F2	Profit after financial items	-26.35%	-1.83%	14.49%	-22.86%
F3	Equity ratio	6.70%	-0.61%	8.55%	3.56%
CUSTOMER PERSPECTIVE					
C	Customer Satisfaction Index (CSI)	3.28%	-22.22%	0.00%	32.65%
INTERNAL PROCESS PERSPECTIVE					
S1	Attractive employer	-8.58%	42.35%	-20.77%	-1.94%
S2	Have a good, safe, and developing work environment	-2.91%	4.61%	-2.78%	-3.75%
ENVIRONMENT PERSPECTIVE					
E1	Reduced climate impact	-24.21%	0.00%	-11.11%	20.31%
E2	Reduced local environmental impact	13.33%	-8.44%	-0.93%	-14.03%
E3	Reduced use of resources	6.37%	0.70%	-2.55%	-3.49%

Correlation analysis is used to further determine the link of each perspective. Correlation had been understood as a qualitatively described relationship, not deterministic but of a statistical nature, however, observed at that time within a rather narrow area of phenomena (Oja & Shevlyakov, 2016). Correlation is the degree to which two events or variables are consistently related. This measure indicates both the degree and direction of the relationship between variables. However, it yields no information concerning the cause of the relationship (Wienclaw, 2019). The limit of strong and weak correlation interpretation is based on statistician practices (Rumsey, 2003). In this research, a strong correlation is predefined as a correlation below -0.5 or above +0.5. The correlation table of Port of Gothenburg perspectives is shown by
Table 12 below.

Table 12 Correlation of SBSC perspectives of Port of Gothenburg 2014-2019

	F1	F2	F3	C	S1	S2	E1	E2	E3
F1	1.00	0.57	0.59	-0.57	-0.34	0.01	-0.88	0.71	0.37
F2	0.57	1.00	0.15	-0.52	0.00	0.31	-0.12	-0.18	-0.46
F3	0.59	0.15	1.00	0.33	-0.96	-0.80	-0.51	0.58	0.06
C	-0.57	-0.52	0.33	1.00	-0.58	-0.83	0.50	-0.24	-0.37
S1	-0.34	0.00	-0.96	-0.58	1.00	0.93	0.28	-0.41	0.09
S2	0.01	0.31	-0.80	-0.83	0.93	1.00	0.03	-0.25	0.12
E1	-0.88	-0.12	-0.51	0.50	0.28	0.03	1.00	-0.95	-0.77
E2	0.71	-0.18	0.58	-0.24	-0.41	-0.25	-0.95	1.00	0.84
E3	0.37	-0.46	0.06	-0.37	0.09	0.12	-0.77	0.84	1.00

There is a strong positive correlation within financial perspectives (F1, F2, and F3). F1 (Return of fixed assets) also has a strong negative correlation with C (Customer Perspective Index) and E1 (Reduce climate impact), while on the other hand, F1 has a strong positive correlation with E2 (Reduce local environment impact). F2 (Profit after financial items) has a strong negative correlation with C (Customer Perspective Index). F3 (Equity ratio) has a strong negatives correlation with S1 (Attractive employer), S2 (Have a good, safe, and developing work environment), and E1 (Reduce climate impact). But F3 has a strong positive correlation with E2 (Reduce local environment impact).

Customer perspective (C) has a strong negatives correlation with F1 (return of fixed assets), F2 (profit after financial items), S1 (Attractive employer), and S2 (Have a good, safe, and developing work environment). There is no strong positive correlation between Customer perspective with any other perspectives.

Both Employee and Society Perspectives: S1 (Attractive employer) and S2 (Have a good, safe, and developing work environment) have the same correlation pattern. Both have a strong negative correlation with F3 (Equity ratio) and C (Customer Satisfaction Index) and a positive strong correlation to each other (within perspectives).

E1 (Reduce climate impact) has strong negative correlations with F1 (Return of fixed assets), F3 (Equity ratio), E2 (Reduced local environment impact), and E3 (Reduced use of resources). E1 does not have a strong positive correlation with other perspectives. E2 (Reduced local environment impact) has a strong positive correlation with F1 (Return of fixed assets), F3 (Equity ratio), and E3 (Reduced use of resources). E2 also has a strong negative correlation with E1 (Reduce climate impact). E3 (reduced use of resources) has a strong negative correlation with E1 (Reduce climate impact) and a strong positive correlation with E2 (Reduced local environment impact).

Strategy Map of Port of Gothenburg

The strategy map is a method to translate the Balanced Scorecard by providing a coherent understanding of an organization's strategy story (Kaplan & Norton, 2004). The Strategy map is considered as a logical and comprehensive architecture for describing strategy and help strategy execution and it “specifies the critical elements and their linkages for an organization’s strategy (Kaplan & Norton, 2001). The design of the strategy map of this study is following a hypothetical model from (Islam, 2018) that includes 14 principles.

The link between the strategy maps is based on correlation analysis. The strategy map of Port of Gothenburg is illustrated in Figure 12 below.

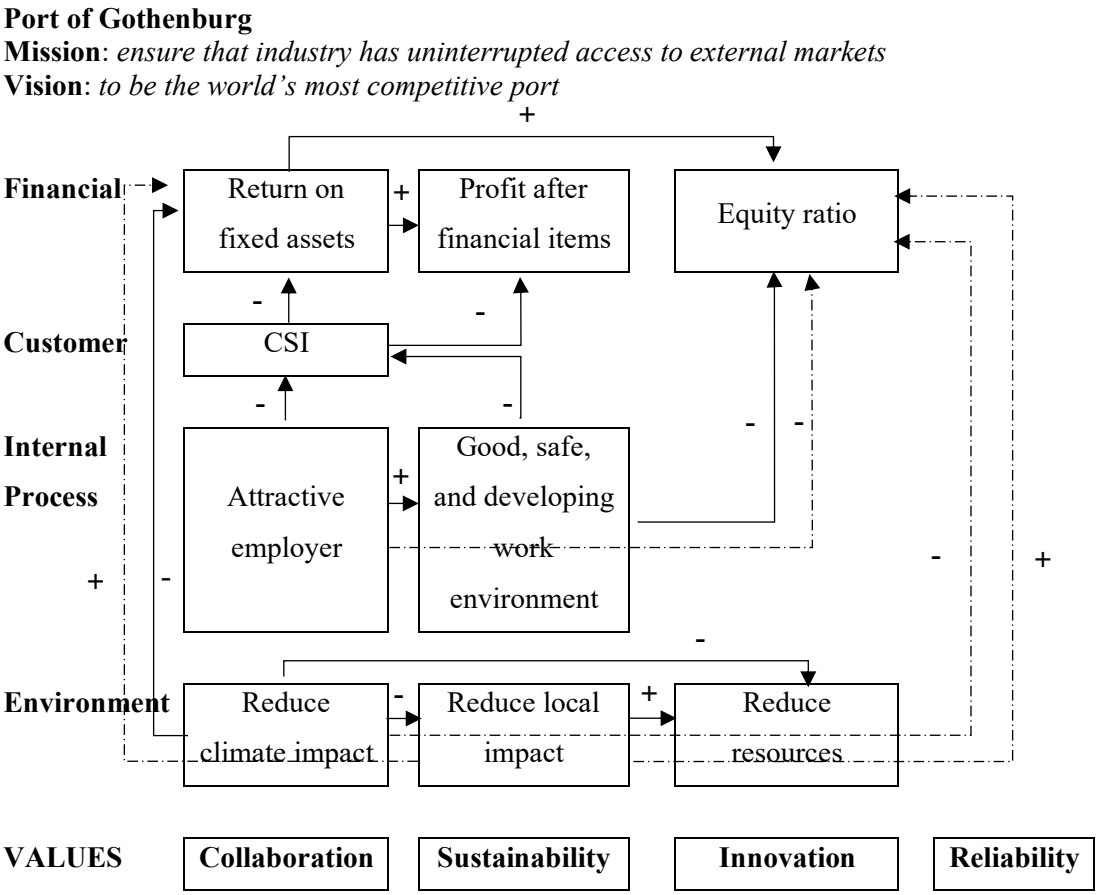


Figure 12 Strategy maps of Port of Gothenburg 2015-2019.

4.3 Gap Analysis of Tanjung Priok Port on Sustainability

This section shows the gap analysis of Tanjung Priok Port initiatives towards sustainability. The method used the current condition of the port and compare it to the global trend and best practice of Port of Gothenburg. The analysis includes four sections: financial, social, environment, and reporting aspects.

Financial

There is no current financial parameter measurement in the sustainability plan of Tanjung Priok Port Authority. The Port Authority is part of the ministry of transportation in Indonesia that is a nonprofit office. This gap could be filled by Port Authority to set their financial parameter related to the business model or organization vision. Port of Gothenburg complies with financial parameter measurement of return on fixed assets, profit after financial items, equity ratio. An example of financial parameter measurement by Tanjung Priok Port Authority may include the realization of a public service project by the Port Authority, including port development, engineering study (feasibility study, detail engineering, masterplan). Another solution to collaborate with the port operator, Indonesian Port Corporation (IPC) for mutual financial parameter assessment. The gap analysis on the financial aspect of Tanjung Priok port is shown by Table 13 below.

Table 13 Gap analysis on financial aspect of Tanjung Priok port

DESIRED FUTURE STATE	CURRENT PLAN	IDENTIFIED GAP	ACTION PLAN
Sustainability reporting to include financial parameter	No financial parameter measurement by Tanjung Priok Port Authority	- Government body does not comply with the economic aspect of port - No collaboration with port operator	- Internal measurement of Port Authority office economy performance, or - Collaboration with port operator regarding port economy performance measurement

Social

The concern of Tanjung Priok Port Authority in the social aspect is only local communities' engagement towards sustainability movement. The foresighted problem is the lack of sustainability understanding of communities because of no integration from state movement towards sustainability, for example, the ban of single-use plastic already implemented by the Jakarta Province government by July 1st, 2020 (Gubernur DKI

Jakarta, 2020), but another incentive, for example, electric public transportation, or trash separation system could not be seen in the city.

Another focus is the stakeholders mapping towards sustainability challenges and mutual engagements for the action. Other stakeholders are not included in the system designed by Tanjung Priok Port Authority. For example, the Port of Gothenburg Port Authority includes customers, port operators, public authorities, terminal operators, and employee unions for sustainability issue mapping. Stakeholders board should be established with clear agenda and mutual vision towards sustainability. The result of a gap analysis on the social aspect of Tanjung Priok is shown by

Table 14 below.

Table 14 Gap analysis on the social aspect of Tanjung Priok port

FOCUS AREA	DESIRED FUTURE STATE	CURRENT PLAN	IDENTIFIED GAP	ACTION PLAN
Local communities' engagement	Local communities help port towards sustainable business practice	Lack of sustainability understanding in local communities	No integration of local government for the sustainability movement	An official corporation with city/state towards sustainable living with local communities
Stakeholders mapping	Stakeholders' involvement in sustainability problem mapping and corporative problem-solving movement	Only local communities considered in social mapping	Other stakeholders are not involved in the sustainability movement	Port stakeholders board establishment (example: customers, port operator, public authorities, terminal operator, and employee's union)

Environment

The focus area of Tanjung Priok Port on environment aspect covers eight aspects including air and dust, water quality, ship, and port waste, energy and climate, port development, bunkering, and hazardous waste, traffic and noise, and ecosystem management. Most of the problems surfaced because of the lack of a sophisticated control system to monitor, for example for air and dust, energy, and contaminated land. Port of Gothenburg uses GRI indexes to measure environmental parameters in the port. By using widely used standards, it opens the opportunity to monitor the progress development or changes done by the actions.

Another concern is to achieve the mutual sustainable goal, Tanjung Priok Port should establish corporation with other stakeholders, for example, Port of Gothenburg is having trouble with side traffic and congestion, a problem that could not be solved only by the

port. The implementation of stakeholder collaborations could give Tanjung Priok Port Authority indication on responsible actors. There is a major problem on the national level regarding energy supply in Indonesia, where the most energy is produced by the coal-powered plant. The port could take the green port initiative by giving tariff discounts on the vessel that operates with alternatives sustainable energy. The result of gap analysis on the environment aspect of Tanjung Priok is shown by
Table 15 below.

Table 15 Gap analysis on the environmental aspects of Tanjung Priok port

FOCUS AREA	DESIRED FUTURE STATE	CURRENT PLAN	IDENTIFIED GAP	ACTION PLAN
Air and dust pollution	Onshore Power Supply (OPS) for berthing ships	A vessel using the onboard generator for electricity	No OPS available	- Onshore Power Supply (OPS) project with the city and power company
	Reduce emission CO2, NOx, HC, SOx, and PM	No emission control	Lack of monitoring system	Standardized monitoring system for CO2, NOx, SOx, and PM
Water Quality	Reduce water used	Irresponsible usage of water	No effective training from the city for water usage	City and port collaboration for water usage training
	Clean water	Bad water quality	Waste treatment not functioning properly	- Wastewater treatment improvement project in the port
	Water quality monitoring	No water quality monitoring	Double management with Port operator	Integration and one data gate solution of port performance.
Ship and port waste	Port Authority approval is needed for waste handling	- The port user handing waste without PA approval	- The lack of understanding of waste management system	- Waste management campaign and fine system for violation
	Well-functioning waste system	Improperly working waste system	low maintenance waste system	waste management system maintenance system
Energy and climate	Lower energy usage	Low-performance equipment	No equipment refreshment plans	Energy-efficient equipment and building regeneration plan
	Sustainable energy alternatives	Coal sourced electricity	No incentives to alternative energy	Incentives for alternative energy source (green port initiatives)

FOCUS AREA	DESIRED FUTURE STATE	CURRENT PLAN	IDENTIFIED GAP	ACTION PLAN
Reclamation, port development, and operational	Green port development	Limited environment aspect criteria on port development	Green planning only includes green land building	Green plan for port development for example traffic management
Bunkering, hazardous cargo, and contaminated land	Established land quality management system	No land quality management system implemented Contaminated land indicators on docks and warehouse	No clear instruction on land quality management system	Implement or adopt a well-established land quality management system
Traffic and noise	- Traffic zone limitation	- There are congestion and mixed traffic in the port area	- Lack of buffer zone and low traffic restriction implementation	- Port development plan to include adequate buffer zone and traffic separation
	Low noise in port	Over limit noise in port	Aged low performing port equipment	Low noise port equipment regeneration plan
Ecosystem management	Lower impacted biodiversity by port	State biodiversity is threatened by vast development, including port	No collaboration with Ministry of Environmental or state office towards biodiversity rehabilitation	Engagement with the environmental body to restore or lower the impact of port activities

Sustainability reporting

Tanjung Priok Port Authority is committed to reporting the implementation of Ecoport yearly. But the discussion on how the report was published is still on the discussion. Although it is impossible to compare a port effort towards sustainability from one to another, using the same sustainability reporting scheme as the biggest ports could open an international industry collaboration. The result of the gap analysis on the sustainability reporting of Tanjung Priok is shown by Table 16 below.

Table 16 Gap analysis on the sustainability reporting aspect of Tanjung Priok port

FOCUS AREA	DESIRED FUTURE STATE	CURRENT PLAN	IDENTIFIED GAP	ACTION PLAN
Reporting	Comply with international standard	Unestablished format of the annual report	The study of Ecoport is adopting more than one concepts of Greenport / sustainable port	Adapt to a single widely used system and adapt accordingly, for example, GRI, Ecoport reports

5 Discussion and Analysis

This part will discuss the findings in this study with previous theories and findings. There are several findings in this study that support the original theory but also there are some new findings contradictive to the theory. This part will cover the sustainable port practice of Port of Gothenburg, Sustainable Balanced Scorecard (SBSC) of Port of Gothenburg, and gap analysis of Tanjung Priok Port on sustainability.

5.1 Sustainable Practice of Port of Gothenburg

The Port of Gothenburg adopted the sustainable port concept similar to PIANC with Triple Bottom Line (TBL) three aspects: environmental, social, and financial (PIANC, 2014) (Elkington, 1997). But the findings show that the aspects are connected, rather than moving on their own according to Elkington (Elkington, 1997). Most of Port of Gothenburg's excellent efforts towards sustainability are originally meant for efficiency and compliance.

The port reports annually on three aspects: financial, social, and environmental. On the financial aspect, the port actively seek efficiency and focus on making profit. The port considers the investment in sustainability to have more profit than the cost. The social aspect is fulfilled by providing good employment. The port also has its additional direct initiatives towards social aspect for example by providing free meal to the workers. But the port considered contributing indirectly by its profit to the City of Gothenburg will have a better impact on the social aspect. The environmental aspect of Port of Gothenburg is actively improved by reducing the footprint in the Port Authority office, the terminals, and the port area.

There are strategies applied by the port in their sustainability movement including good financial performance, regulatory compliance, transparent reporting, and efficiency improvement. The port mentioned that only by being financially profitable, the port could implement sustainable initiatives. The port complies with national and international regulation in sustainability, especially in environmental and social standard. The port also take a further step by being involved in PERS and ESPO to regulate the sustainable port in Europe. The sustainability performance is reported annually with GRI Standard format and available to the public. The efficiency improvement in Port of Gothenburg lead to better performance in environmental and social aspects.

The biggest driver factor for the Port of Gothenburg sustainability movement is the owner, the City of Gothenburg. The City of Gothenburg is committed to working towards sustainability by the Green Bond Initiatives. This initiative made the Port of Gothenburg pass the financial risk to the city in sustainability work. The port stated that only with support from the City of Gothenburg the sustainability movement is possible to realize.

5.2 Sustainable Balanced Scorecard of Port of Gothenburg

The Port of Gothenburg initiatives proved the company gain advantages by implementing sustainability which confirmed the theory of sustainability usage (Figge, Hahn, Schaltegger, & Wagner, 2002). The port served as a role model in sustainable port and the performance increased. The port is currently one of the most recognizable sustainable ports. The port also integrated sustainability into its overall vision, and it brings improved performance and benefits.

There are findings in this study that are different than the reference model of the Sustainable Maritime Balanced Scorecard (SMBSC) (Sislian & Jaegler, 2018). The SMBSC of Port of Alexandria combined the social and environmental aspects in the analysis. Where the Port of Gothenburg have social and environment separated. But the SBSC of Port of Gothenburg confirms the reference by showing where the port lack performance and where the port excel. This study result also shows the further discovery of how the perspectives of Port of Gothenburg correlate to each other. This finding confirming the reference about the usage of SBSC as stakeholder input for decision making (Sislian & Jaegler, 2018).

The SBSC gives the Port of Gothenburg view on the four perspectives. The analysis shows some aspects that need improvement and other aspects that already accomplished objectives. The financial and internal perspectives show declined performance while the customer perspective shows improved performance. The environmental perspective shows where there are both improvements and declining performance. The correlation between perspectives gives the port chance to set strategy and prioritize the resource to achieve new set goals.

5.3 Gap Analysis Tanjung Priok Port on Sustainability

The results of the gap analysis confirm the theory and studies. It shows there are gaps in four aspects of sustainability. The result gives a simplified overview of Tanjung Priok Port's current progress towards sustainability (Karbhari, et al., 2003). The data also analyzed from company report that available to the public. The analysis is following the four steps that include desired future state, current plan, identified gap, and action plan (Scott, 2000) (Karbhari, et al., 2003) (Nolan, Goodstein, & Goodstein, 2008).

There are findings in the study that confirm the theory of alternative solutions for the gaps (Nolan, Goodstein, & Goodstein, 2008). The finding shows the most common reason for the gaps is the lack of maintenance and monitoring system. The organization have a broader goal to achieve sustainability level according to international standard. The current state of Tanjung Priok Port does not show good progress on sustainability work. The solution suggested that there are improvements should be made within the organization itself.

There are gaps in the financial, social, environmental, and sustainability reporting in Tanjung Priok Port's work towards sustainability. The financial aspect is lacking the availability of the reporting format. The gap can be filled by collaboration with other stakeholders or by publishing an annual sustainability report, similar to the Port of Gothenburg. The social aspect has gaps in local engagement and stakeholders mapping. The stakeholders inside and outside the port are important in the sustainability work of the port. The environmental aspect shows major gaps in air and dust pollution, water quality, ship waste, energy and climate, port development, hazardous waste, traffic noise, and ecology management. The environmental issues are major in Tanjung Priok Port. The current condition shows that gaps are caused by a lack of maintenance and availability of monitoring systems in the port. There is still an unavailability of sustainability reporting from Tanjung Priok Port. The transparency and reporting would help the port to open the opportunity and support from the stakeholders.

6 Conclusion and Recommendation

6.1 Conclusion

This chapter summarizes the answer to the three research questions based on the findings. The summarized answers are presented below.

Research question 1: How a sustainable port practices its sustainability work?

The Port of Gothenburg practices sustainability with the support of the City of Gothenburg. By securing the financial aspect first, the port then moves towards the other sustainability sector: the social and environmental. The three sustainability aspects of Port of Gothenburg are connected. Where the improvement in efficiency and regulation compliance would lead to good performance in social and environmental aspects. The benefit of being a sustainable port for the Port of Gothenburg overcomes the investment made.

Research question 2: How does a sustainable port practice compares to academic assessment?

The SBSC of Port of Gothenburg shows that there are very interesting correlations between each perspective. The environment perspective aspects have a mixed positive and negative strong correlation to financial perspective aspects. Even though Port of Gothenburg sets sustainability as their vision does not mean that increased performance in environmental performance is followed by financial performance. This study finds that the Customer perspective and Internal perspective both have negative strong correlations to the financial perspective. Increased performance in Customer or Internal perspective might be followed by decrease performance in Financial in Port of Gothenburg. The study also finds that the Environment perspective has mixed positive and negative between reduced climate impact, local use, and resource use. These dynamics should be inspected deeper to see the causation and possibility of perspectives having a strong positive correlation in the future.

Research questions 3: What are the gaps in the Tanjung Priok Port approach to sustainability?

There are gaps in the Tanjung Priok Port Ecoport concept analyzed in this research in financial, social, environmental, and sustainability reporting. The result shows that gaps are because of the lack of compliance and support from other stakeholders. There are unavailable systems in financial, social, and reporting aspects. The environmental aspect shows big gaps in most of the sectors where the reason is shortfall of maintenance and monitoring system.

6.2 Recommendation for Further Study

The recommendation for future study is to compare more sustainable port practices. The research questions are answered accordingly although comparing the sustainable port practice of Port of Gothenburg and Ecoport concept by Tanjung Priok Port Authority. The two concepts are not fundamentally similar. The comparison. Another method of academic sustainability measurement could be used to see the port performance. It is recommended to have a clear predefined limit and timeline of the research.

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8 Appendix

8.1 Date of the interviews

Date of interview	Company	Interviewee	Position
4 March 2020	The Port of Gothenburg	Edvard Molitor	Head of sustainability
9 March 2020	Tanjung Priok Port	Gerhard Fernanto	Port development and planning

8.2 Interview Questions for Port of Gothenburg

1. Can you give an overview of the Port of Gothenburg effort towards sustainability?
2. What is the concept of sustainability for Port of Gothenburg?
3. What is the result of sustainability efforts for the last five to ten years?
4. What was the reason for Port of Gothenburg going sustainable?
5. What are the drivers behind the movement?
6. What are the management strategies towards sustainability?
7. What are the measurements of a sustainable Port?
8. Is there any different perception in the business partner of Port of Gothenburg?

8.3 Interview Questions for Tanjung Priok Port

1. Can you give an overview of Tanjung Priok's effort towards sustainability?
2. What is the concept of sustainability for Tanjung Priok Port?
3. What are the elements of sustainability in Tanjung Priok Port?
4. How is the current condition of sustainability effort in Tanjung Priok Port?
5. Who are the stakeholders of Tanjung Priok Port?

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