



## **HOW SHIP MANAGERS PERCEIVE THE OPERATIONAL EFFICIENCY OF SHIPPING COMPANIES: A QUALITATIVE INQUIRY**

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### **ABSTRACT**

In this study, we investigated ship managers' perceptions of shipping companies' operational efficiency. Semi-structured interviews were conducted with five respondents: two from Malaysia and three from Singapore. Further, we constructed four new themes from the interviews, consisting of fifteen categories and eighty-eight new subcategories. In general, this paper proposed two new conceptual frameworks and an improvised physical-efficiency model. This paper is the first to analyze the shipping efficiency qualitatively in this region to the best of our knowledge.

JEL Classification: D20, L91, M20

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### **1. INTRODUCTION**

External and internal developments in the industry can have several implications for the operational, commercial and strategic management of ships and shipping companies that must efficiently follow and respond to these pressures (Mitroussi, 2013). Thus, efficiency evaluation has become an alternative to a company's performance management (Sowlati, 2005) to assist the company with different aspects, including stabilization of its financial health (Gökgöz and Çandarlı, 2011).

Classical engineering science considers a physical/value output to manpower as a ratio defining efficiency. Based on this perspective, human resource commitment is the main dimension of efficiency, and it promises an understanding of production quality. According to this perspective, the human resource system can control organizational performance in manufacturing (Arthur, 1994). Mentzer and Konrad (1991) believe that resource utilization has a possible influence on logistics performance.

On the other hand, Caplice and Sheffi (1994) highlighted that time, distance, and money are the relevant metrics for evaluating the logistics process. Moreover, the performance of a logistics process is captured in three primary forms: utilization, productivity and effectiveness. Utilization measures the input efficiency, comparing the actual inputs to the normal inputs. Similarly, effectiveness measures the output efficiency using actual outputs versus the normal output ratio. Meanwhile, productivity compares the actual outputs to actual inputs. The efficiency depends on the measurement dimension, and whether it comes from the outputs or the input quality. Therefore, a firm can be considered technically efficient if it can achieve maximum output from its set of inputs (Talas et al., 2013) or minimize its consumption of inputs to produce a given output level (Kuwahara et al., 2013). This study considers these logistics efficiency perspectives to be fundamental information to further explore at an operational level.

Operational efficiency determines daily monitoring units for benchmarking the shipping company. The problem of the current study thus comes from some overall unclear perspectives of shipping companies' processes and whether these ship managers perceive that this operational efficiency is used in improving shipping industry productivity. For example, Samuelsson and Tilanus (1997) formulated a four-dimensional, physical efficiency model of good transportation, providing evidence to support the importance of the speed, time, distance and capacity as the actual transportation output. However, McKinnon and Ge (2004) revealed that the perspectives of food supply chain managers are different.

The rest of this paper is structured as follows: section 2 gives the literature review, section 3 explains the methodology of the study, section 4 discusses the results, section 5 on discussion, section 6 gives the conclusion, and finally section 7 on recommendations for future research.

## 2. RELATED LITERATURE AND PRIOR STUDIES

After World War I, some of the information associated with efficiency was misplaced and is therefore unavailable. The first work in benchmarking effectiveness began in 1907 in Great Britain and 1909 in the United States (Flux, 1933). Later, Rostas (1943) surveyed productivity in Germany, the United Kingdom (UK), and the United States (US) in the 1920s and 1930s. The study found that the United Kingdom scored the lowest for productivity compared to the other two nations. Later, Smith et al. (1982) conducted a comparative analysis to evaluate labor productivity and verified that work productivity in the US and Germany exceeded that of the UK. Nevertheless, this statement was only valid for the British heavy industries. Broadberry and Fremdling (1990) later reanalyzed these prior works and realized that Britain's labor productivity was considerably higher than that of Germany and the US.

These works have provided a basis of understanding for improving efficiency control. Nevertheless, study on efficiency has primarily centered on the manufacturing industry only (Smith et al., 1982). The concerns regarding manufacturing efficiency remain legitimate. Arthur (1994) has furnished some evidence that the human resource system can facilitate excellent organizational overall performance in manufacturing. Apart from the human element, the science capabilities and an exemplary management structure can increase a company's overall performance. Isobe, Makino, and Montgomery (2008) have recommended two essential features to boost efficiency: 1) refinement of abilities just for the short term; 2) reconfiguration of capabilities for the long run. Likewise, Yeung and Mok (2008) concluded that the ISO 9000 certification improved the output of Chinese foreign-owned manufacturing firms. Regarding efficiency in manufacturing, Rosli and Sidek (2013) recently discovered that product development and process innovation greatly influenced Malaysian SMEs.

### 2.1 EFFICIENCY IN THE MARITIME INDUSTRY

Førsund (1992) found the ferry operators in Norway were facing losses due to bridges between the islands, which meant Norwegians migrated toward highway transport, and use of ferries diminished. Thus, ferry operators need to compete against one another for fewer ferry passengers. Because the ferries are operated by private entities and working at a loss, rewards from the management may give a

lifeline for the market. Though the administration has assisted the ferry business, lump-sum compensation is currently necessary. Consequently, a beginning study estimated the fair price of operating ferries and centered on ferry efficiency. As an outcome, Førsund's study observed a possible cost-saving and efficiency gain. Nonetheless, it did not state how to boost efficiency.

Likewise, a comparable analysis to estimate the possible productivity and efficiency improvement in the Norwegian ferry industry was conducted by Odeck (2008). One finding was common to both studies: the current inefficiency in Norway's ferry industry. The nature of the route where ferries operated, the kind of ferries used, and the year they were built were the main contributing factors to ferry efficiency. Though the motivation to compensate ferry operators for their losses is essential, the study recommended investment in subsidised enhancements to brand new ferries to help the Norwegian ferry operators.

Unlike the ferry industry, the primary difficulties in ocean fishing are regulations and management. A report on the mid-Atlantic fishery by Kirkley, Squires and Strand (1995) argued that regulation formulation demanded an evaluation of specialized efficiency. Scholars have recognized that assessing technical effectiveness in the fishing business is complicated by different environmental conditions and resources. They have also discovered that efficiency depends upon the available energy and natural conditions. Substantial technical efficiency occurs where a broad range of inputs and resources are applied. Sharma and Leung (1998) have indicated that awareness of the productivity and overall performance of the science will likewise assist the business in formulating regulations. They investigated multi-product firms to calculate some areas for efficiency improvement that included profit, production, and cost.

Newer reports on the fishing industry have produced similar results. These include studies on efficiency gain and cost reductions by Kompas and Che (2005) and productivity by Kim et al. (2011). They identified several possible price reductions and related production inefficiencies in the fishing business. Besides estimating the effectiveness and giving recommendations for management, investigation in fishing has predicted the exit indications of organizations in the market. For example, Pascoe et al. (2013) highlighted the absence of scale efficiency, technical efficiency, and capacity utilization as business exit indicators.

## 2.2 EFFICIENCY IN THE SHIPPING INDUSTRY

Managi (2007) strongly argues that efficiency is the primary key to extending economic growth, and it is also much more critical than input-driven growth and capital-orientated growth. Using this brand-new approach to determine the output of Japanese shipping, the author discovered that productivity changes were mainly driven by technical changes, which reduced labor cost. Lowering resource cost is inadequate for ascertaining effectiveness (Chang and Liao, 2012). Indeed, a few scientific studies have examined human resource utilization in global shipping companies and proved it did not significantly affect productivity.

Recently, scholars have argued that merging and creating alliances between shipping companies will resolve problems arising from the worldwide crisis (Gutiérrez, Lozano, and Furió, 2014). Nevertheless, shipping companies face many challenges when seeking mergers and alliances; among the difficulties is determining with whom to develop such partnerships. Those high performers are generally reluctant to connect with companies in decline. Where these businesses are in a position to benchmark one another on effectiveness and productivity, they improve the procedure of determining and choosing the most effective partner.

## 2.3 SHIPPING INDUSTRY IN MALAYSIA AND SINGAPORE

Malaysia and Singapore are located in South East Asia and are founding members of the Association of South East Asian Nations (ASEAN). Being countries bordering the Malacca Strait and the South China Sea (the main transit route between East and West Asia), Malaysia and Singapore play a broader role in the economic, socio-political and administrative perspective.

The overall economic growth of ASEAN as a region is positively affected by the ASEAN countries such as Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore and Thailand (Iqbal and Rahman, 2015). According to the International Monetary Fund report, in 2017, Malaysia and Singapore's gross domestic product growth was 5.9% and 3.6%, respectively.

In ASEAN countries, shipping is considered the most critical mode of transportation and covers around 80-90% of the volume of imports and exports of a country's cargo (Nguyen, 2016). In addition, imports from ASEAN are growing faster than exports (Ha, Chung, and

Seo, 2016). A total of 3,034 trillion tons of international cargo and 84,326 million twenty-foot equivalent units (TEUs) were traded in 2017 (ASEAN Secretariat, 2018), 68% of which was traded in Malaysia and Singapore.

## 2.4 RESEARCH CONTEXT

This study focuses on shipping owners representing the constituent part of a publicly-traded shipping company in Malaysia and Singapore. Eighteen shipping companies were listed in Bursa Malaysia or the Kuala Lumpur Stock Exchange and sixteen shipping companies on the Singapore Exchange in 2018. Few small shipping companies, however, are registered and operated under local authorities, such as Marine Department Malaysia and Maritime and Port Authority of Singapore. As a focus of the study, vessel owners must be employees in a managerial role in any publicly-listed shipping company and operate ships from Malaysia or Singapore when opting for this study. Ship owners' shipboard experiences are not scrutinized if they know the commercial element of a shipping operation. Still, during their tenure, they are expected to have visited a ship at least once to familiarize themselves with the ship operation, although there is no formal requirement for this. In the region, the policies related to shipping management are under local authority jurisdiction.

## 3. METHODOLOGY

### 3.1 RESEARCH QUESTIONS AND FOCUS

This study mainly consists of individual interviews, with central issues related to the effect of operational efficiency on shipping company performance. More specific research questions dealing with the problem are as follows:

1. How does a ship manager perceive a shipping company's efficiency?
2. What are the processes involved in the shipping business as seen by the ship manager?

Based on the above research questions, this study is structured through the following two main areas:

1. A general perception. The informants were asked to clarify their understanding of effective operations for the shipping business, including the factors affecting efficiency, means to measure efficiency, and the methods to procure companies' financial information.
2. The business processes. Respondents have been asked for information about shipping businesses that is crucial from the start-up to decline. For instance, the respondents were asked about the minimum information required at all phases of the shipping process (start-up, maturation, growth, decline).

### 3.2 RESEARCH METHOD

In this study, we conducted semi-structured interviews to investigate ship managers' perceptions of shipping industry efficiency. The interviewees were asked to indicate their opinions on each listed item in the questionnaire. The questionnaires used in the semi-structured interviews were pilot tested and corrected by faculty members of the Marine Engineering Department at the Malaysian Maritime Academy. The same questionnaires were used in the interview sessions to enable the informants to provide the required information in a narrative fashion. Each interviewee was briefed on the interview protocols, and consent was obtained for audiotaping the interview. Then, the interview audit files were transcribed by an external transcription service provider.

### 3.3 RESEARCH PARTICIPANTS AND ETHICAL CONSIDERATION

Informed consent was obtained from all participants and followed the procedure required by the ethical standards of the International Islamic University of Malaysia Research Ethics Committee. The target population for the study consisted of individual shipping operations, regardless of the respondent's nationality or place of residency. The sample was selected using the self-sampling method. Ship managers of major shipping companies in Malaysia and Singapore (a total of thirty-four companies) were invited via email to participate in this study, while only five accepted the invitation; among them, three opted for the open-ended online survey. The active response rate was computed as 14.7%, which is not uncommon for a postal survey (MacDonald and Headlam, 2008). The questionnaire reviews all aspects of the shipping industry operational efficiency to ensure effectiveness in achieving the study goals.

### 3.4 RESEARCH INSTRUMENT

The questionnaire has five sections. The first one is designed to collect demographic information of respondents and their company backgrounds. The second covers ship manager perceptions, while the third covers the shipping business associated processes. The fourth section gathers information related to the inputs required to run a shipping company and the outputs. The last part captures the shipping companies' strategies and initiatives. These five sections are considered adequate for measuring the shipping industry efficiency as ship managers themselves perceive it.

The first section, which covers respondent demographic information and company background, consists of five items, including respondent's position in the organization, the company demographic location, type of fleets in the company, fleet size and the number of employees. The second section consists of seven items used to define the shipping company efficiency. The required data to solve the first research question explained the ship managers' perception of the shipping industry efficiency. The five items are included in the third section of the questionnaire, and it addresses the second research question. The fourth section consists of ten items to address the third research question and inform on the factors affecting efficiency, while the last section covers the strategy elements in three items. Altogether, thirty questions were utilized to explore how the ship managers perceive shipping industry efficiency.

### 3.5 APPROACH TO ANALYSIS

We analyzed the data through several steps. As a beginning, we deployed narrative analysis to explore socially built links, relationships and explanations that occur naturally within narrative accounts (Saunders, Lewis, and Thornhill, 2009). Narrative analysis is popular for its inherent and subjective perspective (Greenhalgh, Russell, and Swinglehurst, 2005). First, we organized our qualitative data such as interview audio files, transcription files, fieldnotes text files, and an open-ended questionnaire response into computer files. Second, we used the method of display and analysis of Miles, Huberman and Saldaña (1994) to manage and assemble data into a summary of the diagram or visual display. Third, we read data several times to explore the sense of general data. We analyzed data by hand and recorded it as a Word document. This includes reducing data, display, and drawing and verifying conclusions. Finally, we found the text segment and assigned themes for use in research reports. In short,



we used a deductive encoding approach to aggregating the main ideas into the theme.

To investigate the validity of research findings, we used member checking and an external audit method. First, the main ideas generated from the verbatim transcripts were presented to colleagues in the maritime education and training institute. Second, the research findings were emailed to local university academicians who assessed whether the generated themes are valid or not valid in representing the main ideas and the verbatim transcripts. Based on inter-rater recommendations, the final themes were suggested and presented in the results section.

## 4. RESULTS AND FINDINGS

### 4.1 DEMOGRAPHIC VARIABLES

Table 1 displays the results of our data analysis in adherence with the goals of the study. Table 1 demonstrates the following:

1. All five respondents hold top-level management positions, which means that they have the decision-making power and oversee the overall shipping process. Therefore respondents have enough experience and information to answer the questionnaire items.
2. Three respondents are from Singapore-based companies. It is widespread that the ship owners and the ship managers operate from different locations, and most of the ship-managing companies are located in Singapore for better marketing.
3. Some companies operate more than one type of vessel, and respondents have enough experience to share their sustainability opinions. One respondent says Singapore is strategically located in the middle of international trade routes from east to west or vice-versa. The product/chemical vessels act as feeder/bunker vessels for the deep-going vessels.
4. Three respondents manage fewer than fifty vessels. This relatively small fleet provides greater validity to the results of this study because a small fleet company can understand well the importance of efficiency and have more ability to minimize wastage to compete with others in the same industry.
5. Three respondents are from big organizations, which is considered a strength for this study because large organizations have departmental performance contracts, performance scorecards, and performance evaluations in place, so these respondents have more

ability to provide the appropriate answers to the questionnaire items.

6. Based on the related statistics of the study sample, it is now clear that knowledge of the shipping industry and its operations is available among respondents. Moreover, these preliminary statistics show that respondents can understand the questionnaire items and have the required ability to provide valid answers to them.

TABLE 1  
Demographic Characteristics of Respondents

Item No.	Demographic item	Answer options	Number	Valid percent
1	Position in organization	Chief Executive Officer	1	20 %
		Top-level management	4	80 %
		Total	5	100 %
2	Company location	Malaysia	2	40 %
		Singapore	3	60 %
		Total	5	100 %
3	Type of ships	Bulkers	1	12.5 %
		Product/ chemical tankers	3	37.5 %
		LNG/ LPG carriers	1	12.5 %
		Offshore support vessel	1	12.5 %
		Others	2	25 %
		Total	8*	100 %
4	Fleet size	Fewer than 50 vessels	3	60 %
		51-100 vessels	1	20 %
		More than 100 vessels	1	20 %
		Total	5	100 %

TABLE 1 (continued)

Item No.	Demographic item	Answer options	Number	Valid percent
5	Number of employees	Fewer than 100 staff	1	20 %
		101-200 staff	1	20%
		More than 200 staff	3	60%
Total			5	100 %

\*Some companies operate more than one type of vessel.

Notes: This table exhibits the respondent demographics and their company backgrounds. A total of five respondents participated in this study.

## 4.2 MAIN FINDINGS

### 4.2.1 THEME 1: THE GENERAL PERCEPTION

The informants in this analysis had been asked about their perceptions on efficiency dimensions and measurement. To begin, all informants were required to list the elements that indicate their company's effectiveness. Most of them had various opinions on efficiency. It was highlighted that dependable service and also more secure operation would gain more shipping business, as the maritime industry expects vessels to operate with no serious incidents.

Another informant saw general efficiency from an alternative perspective, claiming the earnings and turnaround indicate business effectiveness, with minimal downtime and profit maximization being the key elements.

Other informants found that specialized capability, cost optimization, vessel utilization, effective online resources, good teamwork, management assistance, industry best practices, and timely delivery can also signify an effective shipping business operation. Table 2 summarizes the findings on efficiency dimensions.

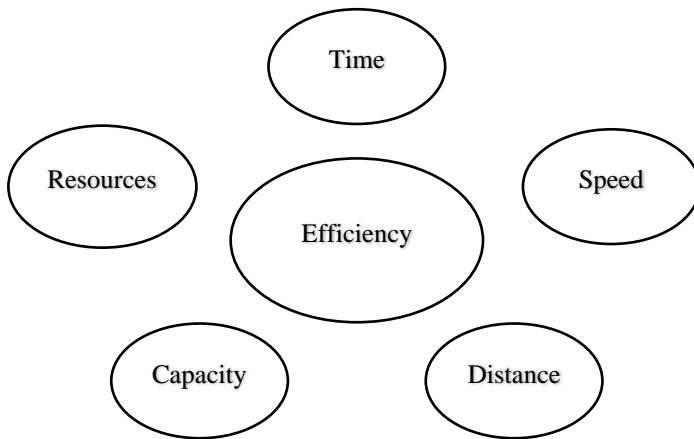
Next, the informants were asked precisely how they might gauge these factors. Informants shared appropriate and possible actions, including cargo delivery time and duration, quantity and quality of cargo shipped, client feedback, vessel scheduling, then benchmarking. Informants, in addition, highlighted the day ship operating expenses, turnaround figures, audit reports, and key performance indices; moreover the profit and loss (P&L) statement has all of the information necessary for computing efficiency.

**TABLE 2**  
Findings on Efficiency Dimensions

Research Question	Main Ideas
How does the shipowner perceive/define the efficiency of the shipping company?	Service reliability
	Safe operation
	Technical capability
	Cost optimization
	Vessel utilization
	Resource efficiency
	Profit maximization
	Good teamwork
	Management support
	Industry best practices

The different claims by informants highlight the significance of the four-dimensional physical efficiency model. The brand-new dimensions in the actual physical efficiency model determined in this particular study (e.g., service dependability, great teamwork, and management support) show the value of the human element in efficiency. Figure 1 shows the revised five-dimensional physical efficiency model suggested in this study.

**FIGURE 1**  
Revised Five-dimensional Physical Efficiency Model



Notes: This figure shows the proposed new physical efficiency model, with 'Resources' added to the original model proposed by Samuelsson and Tilanus (1997).

#### 4.2.2 THEME 2: THE BUSINESS PROCESSES

The informants were asked to imagine beginning a brand-new shipping company and then requested to elaborate on the processes/activities. Several responses were prevalent among the different informants. Most of them stressed that shipping companies have to have ships along with a management group. Thus, the initial stages in establishing a shipping company are purchasing a ship and creating a management team. To buy a ship, the team should first secure investors.

Informants explained that the shipping company could own their vessels or outsource to a third party. Naturally, outsourcing involves extra cost, but a holistic solution might be supplied covering technical (spares, along with maintenance), crew (manpower to work the ship), and fleet (chartering, bunkering etc.) management solutions as a separate or whole service. Below are several of the verbatim responses on this particular subject:

"First you got your initial cost to purchase the ship, right, your investment, then you got to put in your ship operating cost, that means your technical management." (Informant 1)

"First you must have a good contract, you need to have a contract, then you need to have a good ship in order to serve the contract ... you can leave it to a third-party ship management service, but they come with a cost." (Informant 2)

Different points highlighted throughout the interviews were contracts, bank transactions, and approvals. A shipment contract is vital for securing investors. Moreover, the shipping business should have the ability to arrange a repayment schedule for the financier (usually an investment bank). Like every other business, approval to build a business can also be necessary. Nevertheless, like some other industries, shipping companies will also be susceptible to marine department approval. The marine department will ensure that ships meet the global standard and grant approval to use them.

The informants were then required to comment on the inputs necessary to start up a shipping company. Aside from the standard method inputs (e.g., staff, materials), and assets, they highlighted that a contract, business approach, along certain market conditions were also necessary to begin a shipping business afresh. An upward market condition encourages brand new entrants into the shipping industry, while a long-term contract will draw many more investors.

According to process theory, the output is going to be created after any process. The informants were required to list the outputs of

a shipping business. They advise that you find numerous strategies to calculate the outputs, although in the main the outputs were financial; for instance, total profit, profit/loss after tax, return on investment (ROI), return on equity (ROE), and cash flow.

Informants were questioned further to understand wastage in shipping company processes. According to them, the wastage results from external forces. The most popular response was unforeseen delays due to congested ports, vessel breakdowns, and cargo readiness. Additionally, the ships will require regular maintenance (e.g., docking, planned maintenance schedule, surveys, provision, and stores/spares loading etc.) to fulfil the governing bodies (class, port state, then registrar). For instance, every ship is governed by annual audits/surveys to restore the ship's certificates. Several major inspections are required by these certificates, which will just be performed at the dry dock. During this particular phase, the vessel is inactive.

The informants explained that wastage occurs beyond their control, such as weather, market fluctuations, or maybe third-party dues. For instance, when the weather is bad, the ship gas consumption is above average. Additionally, any alteration of the program to avoid bad weather might lead to delay. Yet another aspect worth mentioning is the currency exchange rate; a shipping business could encounter extra expenses as an outcome of currency fluctuations.

The informants were then asked about their ideas to minimize wastage and enhance operational effectiveness. They again emphasized that the general process required three fundamental inputs: labor, materials, and assets. They practice 'safe manning' during ineffective tasks (e.g. docking, ships, and major breakdowns getting laid up because of no business). Safe manning means minimizing the crew on board for watchkeeping purposes only. During times of safe manning, the number of crew is decreased to a quarter of what is necessary for a voyage. The informants further shared that if a boat had to stay in place for a very long period with no business, liquidizing assets is the sole option to reduce constant expenditure.

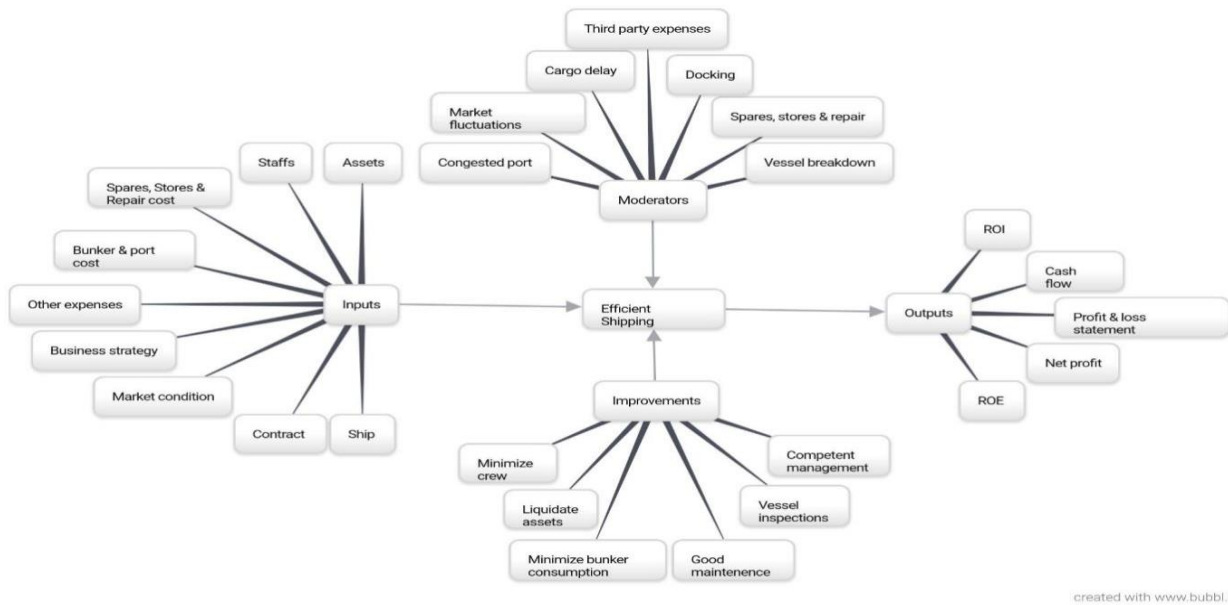
The informants were also questioned about initiatives for enhancing active vessel effectiveness. They claimed that shipping companies had applied the IMO's ship energy efficiency management plan (SEEMP). The SEEMP offers standards for the ship director to control the ships economically. Among the components under the SEEMP, the Energy Efficiency Operational Indicator (EEOI) measures the ship fuel efficiency in operation besides analyzing the

outcome of any functional improvements (e.g., voyage planning, diagnostic maintenance, much more regular inspections) (Asariotis et al., 2015). The following Table 3 and Figure 2 summarize the findings of the business processes of a shipping company.

**TABLE 3**  
**Findings on Business Processes of a Shipping Company**

Inputs	Moderators	Improvements	Outputs
Ships	Congested port	Minimize crew	ROI
Contracts	Market fluctuations	Liquidate assets	Cash flow
Market condition	Cargo delay	Minimize bunker consumption	Profit & loss statement
Business strategy	Docking	Good maintenance	Net profit
Bunker and port cost	Spares, store and repair	Vessel inspections	ROE
Spares, stores and repair cost	Vessel breakdown	Competent management	
Staffs	Third-party expenses		
Assets			
Other expenses			

FIGURE 2  
A Proposed New Conceptual Model for Efficient Shipping



Notes: This figure displays the new proposed conceptual model for efficient shipping. The resources required to start a new shipping business and the expected returns are highlighted in this model. The inefficiency factors and the efficiency improvement factors are also given in this model.



## 5. DISCUSSION

Generally, we find that the respondents in this study clearly understand the definitions, processes and ways of measuring the shipping company operational efficiency. Respondent feedback also supports the idea that shipping company efficiency stems from five dimensions of physical efficiency: resources, time, speed, distance and capacity. These five dimensions of physical efficiency include financial and non-financial variables.

The findings resulted in the recommendation of a few new conceptual models. The resources element was put into the initial four-dimensional actual physical efficiency model created by Samuelsson and Tilanus (1997). The initial model contained capacity, distance, speed, and time as contributing factors to efficiency. Nevertheless, this particular study noted that resources play a crucial part in improving efficiency.

Lastly, this study has proposed a brand-new conceptual model for the shipping industry (Figure 2). All relevant inputs and outputs necessary to begin a brand-new shipping business are captured by this design. These findings indicate the shipping industry is an input-orientated industry, therefore, minimizing the inputs can make it possible to sustain company operations. Moreover, this model additionally highlights the wastage in the system and also suggests just how efficiency might be improved.

## 6. CONCLUSION

In this qualitative study, we conducted semi-structured interviews with ship managers to learn their perceptions of shipping company operational efficiency. The generated themes have been reviewed with supporting quotes from the recorded interviews. This study resulted in a five-factor model of shipping business efficiency (resources, time, speed, distance, and capacity). It also produced a new conceptual model for efficient shipping. Since the study adopted a qualitative methodology, a future quantitative study can be carried out to test the new five-factor model.

## 7. RESEARCH LIMITATION AND RECOMMENDATION

Some of the current research weaknesses include a low level of response, the choice of research data analysis, and the validation of the findings' accuracy. We intend to interview all thirty-four shipping

companies registered in Malaysia and Singapore. Because of the nature of the business, some respondents were unavailable to participate in this study. In the future, this research can be issued to others in the region.

In this study, we have chosen the display and analysis methods to produce themes from the narrative. Although our response rate in this study is low, we realized this method might not be suitable for a large number of respondents. We recommend computer-aided qualitative data analysis software for more efficient and effective research analysis.

We have used member checks and external audit methods to validate our findings. For the assessors, we selected academics from local universities for convenience to approach and discuss. If the selected inter-raters were also from an international University, this can strengthen support for our findings.

## REFERENCES

- Arthur, J. "Effects of Human Resource Systems on Manufacturing Performance and Turnover." *Academy of Management Journal* 37, no. 3 (1994): 670–87.
- Asariotis, R., H. Benamara, J. Hoffmann, A. Premti, R. Sanchez, V. Valentine, G. Wilmsmeier, and F. Youssef. "Review of Maritime Transport 2015." *United Nations*. Geneva: United Nations Publication, 2015.
- ASEAN Secretariat. "ASEAN Statistical Yearbook 2018." 2018.
- Broadberry, S.N., and R. Fremdling. "Comparative Productivity in British and German Industry 1907-37." *Oxford Bulletin of Economics and Statistics* 52, no. 4 (1990): 403–21.
- Caplice, C., and Y. Sheffi. "A Review and Evaluation of Logistics Metrics." *The International Journal of Logistics Management* 5, no. 2 (1994): 11–28.
- Chang, H.-J., and L.-C. Liao. "Using the Data Envelopment Analysis (DEA) Model to Evaluate the Operational Efficiency." *African Journal of Business Management* 6, no. 37 (2012): 10143–58.
- Flux, A.W. "Industrial Productivity in Great Britain and the United States." *The Quarterly Journal of Economics* 48, no. 1 (1933): 1–38.
- Førsund, F.R. "A Comparison of Parametric and Non-Parametric Efficiency Measures: The Case of Norwegian Ferries." *Journal of Productivity Analysis* 3, no. 1–2 (1992): 25–43.

- Gökgöz, F., and D. Çandarlı. "Data Envelopment Analysis: A Comparative Measurement for Turkish Pension and Mutual Funds." *International Journal of Economic Perspectives* 5, no. 3 (2011): 261–81.
- Greenhalgh, T., J. Russell, and D. Swinglehurst. "Narrative Methods in Quality Improvement Research." *Quality and Safety in Health Care* 14 (2005): 443–49.
- Gutiérrez, E., S. Lozano, and S. Furió. "Evaluating Efficiency of International Container Shipping Lines: A Bootstrap DEA Approach." *Maritime Economics & Logistics* 16, no. 1 (2014): 55–71.
- Ha, Y.S., K.J. Chung, and J.S. Seo. "An Analysis of Korea-ASEAN Trade and Its Implications for the Shipping Industry in Korea." *Asian Journal of Shipping and Logistics* 32, no. 2 (2016): 63–71.
- Iqbal, B.A., and M.N. Rahman. "Contribution of ASEAN-6 SMEs to Economic Growth of ASEAN." *Economics World* 3, no. 11–12 (2015): 258–69.
- Isobe, T., S. Makino, S., and D. Montgomery. "Technological Capabilities and Firm Performance: The Case of Small Manufacturing Firms in Japan." *Asia Pacific Journal of Management* 25 (2008): 413–28.
- Kim, D.H., K.H. Lee, B.S. Bae, and S.W. Park. "Productive Efficiency of the Sandfish *Arctoscopus Japonicus* Coastal Gillnet Fishery Using Stochastic Frontier Analysis." *Fisheries Science* 77 (2011): 35–40.
- Kirkley, J.E., D. Squires, D., and I.E. Strand. "Assessing Technical Efficiency in Commercial Fisheries: The Mid-Atlantic Sea Scallop Fishery." *American Journal of Agricultural Economics* 77, no. 3 (1995): 686–97.
- Kompas, T., and T. N. Che. "Efficiency Gains and Cost Reductions from Individual Transferable Quotas: A Stochastic Cost Frontier for the Australian South East Fishery." *Journal of Productivity Analysis* 23 (2005): 285–307.
- Kuwahara, Y., S. Nagata, A. Taguchi, T. Naruse, and S. Murashima. "Measuring the Efficiencies of Visiting Nurse Service Agencies Using Data Envelopment Analysis." *Health Care Management Science* 16, no. 3 (2013): 228–35.
- MacDonald, S., and N. Headlam. *Research Methods Handbook: Introductory Guide to Research Methods for Social Research*. Manchester: Centre for Local Economic Strategies, 2008.
- Managi, S. "Maritime Shipping Industry and Productivity in Japan."

- Maritime Economics & Logistics* 9 (2007): 291–301.
- McKinnon, A. C., and Y. Ge. “Use of a Synchronised Vehicle Audit to Determine Opportunities for Improving Transport Efficiency in a Supply Chain.” *International Journal of Logistics: Research and Applications* 7, no. 3 (2004): 219–38.
- Mentzer, T. J., and P.B. Konrad. “An Efficiency / Effectiveness Approach to Logistics Performance Analysis.” *Journal of Business Logistics* 12, no. 1 (1991): 33–62.
- Miles, M.B., A. Michael Huberman and Johnny Saldaña. *Qualitative Data Analysis: A Methods Sourcebook* (3rd Edition). London, England: Sage Publications, 1994.
- Mitroussi, K. “Ship Management: Contemporary Developments and Implications.” *Asian Journal of Shipping and Logistics* 29, no. 2 (2013): 229–48.
- Nguyen, T. T. “An Investigation of the Vietnamese Shipping Industry and Policy Recommendations for Profound Participation into ASEAN Integration.” *Asian Journal of Shipping and Logistics* 32, no. 2 (2016): 81–8.
- Odeck, J. “Efficiency Measurement of Ferries Serving Road Networks in Norway: A Stochastic Frontier Approach.” *Maritime Economics and Logistics* 10 (2008): 409–28.
- Pascoe, S., T. Hutton, I. Van Putten, D. Dennis, T. Skewes, É. Plagányi, and R. Deng. “DEA-Based Predictors for Estimating Fleet Size Changes When Modelling the Introduction of Rights-Based Management.” *European Journal of Operational Research* 230, no. 3 (2013): 681–87.
- Rosli, M.M., and S. Sidek. “The Impact of Innovation on the Performance of Small and Medium Manufacturing Enterprises: Evidence from Malaysia.” *Journal of Innovation Management in Small & Medium Enterprise* 2013 (2013): 1–16.
- Rostas, L. “Industrial Production, Productivity and Distribution in Britain, Germany and the United States.” *The Economic Journal* 53, no. 209 (1943): 39–54.
- Samuelsson, A., and B. Tilanus. “A Framework Efficiency Model for Goods Transportation, with an Application to Regional Less-than-Truckload Distribution.” *Transport Logistics* 1, no. 2 (1997): 139–51.
- Saunders, Mark, Philip Lewis, and Adrian Thornhill. *Research Methods for Business Students* (5th Edition). Harlow, England: Pearson Education Limited, 2009.
- Sharma, K. R., and P. Leung. “Technical Efficiency of the Longline

- Fishery in Hawaii: An Application of a Stochastic Production Frontier.” *Marine Resources Economics* 13, no. 4 (1998): 259–74.
- Smith, A. D., D.M.W.N. Hitchens, and S.W. Davies. “International Industrial Productivity : A Comparison Of Britain, America, and Germany.” *National Institute Economic Review* 34, no. 4 (1982): 13–25.
- Sowlati, T. “Efficiency Studies in Forestry Using Data Envelopment Analysis.” *Forest Products Journal* 55, no. 1 (2005): 49–57.
- Talas, E., A.K. Çelik, F. Çakmak, F.A. Kocacan, and A. Karaibrahimoglu. “Relative Efficiency Measurement of Enterprises Operating in the Oltu Stone Industry Using Data Envelopment Analysis.” *International Journal of Business and Management* 8, no. 6 (2013): 115–27.
- Yeung, G., and V. Mok. “ISO 9000 Certification and Technical Efficiency of Foreign-Financed Manufacturing Firms in Southern China: A Stochastic Frontier Approach.” *Journal of Economic Studies* 35, no. 5 (2008): 385–404.