

## SEAPORT QUALITY: A DEFINITION OF THE CONTEMPORARY SEAPORT MANAGEMENT

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### Abstract

Seaport industry is a dynamic industry and it plays an important role in the current global commerce business. However, in the current trading system, the definition of “seaport quality” is vague among seaport operators and their users. The definition must be very clear to these two different communities in order to improve the sustainability of the industry from the regional and global perspectives. Therefore, this article explores the current literature over a period of 16 years from 1990 until 2016. A total of 110 journals were reviewed to derive the definition of seaport quality from different viewpoints. The main purpose of this article is to explore, derive, and finalise the definition of “seaport quality” from the Malaysian perspective and generalise the finding in the global context. This article employs systematic literature review methodology involving three steps: planning, executing, and reporting as a guideline to define seaport quality. It was found that 27 percent of literature review using Average of Percent Majority Opinion which categorised three elements of seaport quality, seaport effectiveness, seaport reliability, and seaport governance. This clear definition is important for the seaport industry to improve and sustain the growth and commercial value for industry.

**Keywords**--seaport quality, spatial function, Malaysia, seaport system, systematic literature review

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### INTRODUCTION: SIGNIFICANCE OF SEAPORT QUALITY

The role of quality is importance as a fundamental to develop the seaport quality. The quality philosophy that create by pioneers quality will used as a guidelines or as a bridge for knowing the significance of seaport quality. Since 1890's, there was a research that transformed the fisher through the quality control disciplined and comes out with the theory quality is variability. (Shewhart, 1890; 1967; Gehani 1993; Crosby,1999). According to Deming's (1990), the quality is predictability and this pioneers also created the research on quality management that published out the out of crisis based on 14 viewpoints including three quality ingredients: continual improvement, constancy of purpose and profound knowledge. (Gehani, 1993; Demings, 2000). Other than the pioneers quality, Crosby (2006) stated that quality is a conformance to the requirements and he also created the zero defects movements at Martin Marietta. (Gehani,1993; Crosby 2006). On the viewpoint of Juran (2004), quality is fitness for use. For the successful Juran, Juran already develop Juran Trilogy that focused on the cross functional management approach including quality management, quality control and quality improvement. (Gehani 1993; Juran 2004). The other pioneer like Ishikawa and Feigenbaum is focusing on quality control ideas and Feigenbaum stress the importance of customer defining quality.(Ishikawa, 1990; Gehani 1993; Hussain et al., 2017; Feigenbaum, 2004).

Due to the historical of pionners quality, the quality is the bridge of fundamental towards the significance of seaport quality which are supported by United Nations Conference on Trade and Development (UNCTAD). The viewpoint from UNCTAD is began by the significance of seaport performance. The significance of seaport performance is providing the information management towards the planning and controlling purposing for the seaport operation. (UNCTAD,2005) According to the statement, seaport performance also contribute the smoothing and the action that will be taken in the seaport operation. (UNCTAD, 2005). The statement above is refer to the relationship between the seaport quality and seaport performance which giving the strongly positive impact toward the improvement of the seaport

operation. The relation on this statement also create the strengthen of seaport performance while the seaport quality is improve. For example, the improvement of seaport quality is focusing on effectiveness and efficiently on managing cargo handling, reducing the risk of congestion in the seaport and thus obtaining customer satisfaction. So, when the seaport quality manage effectively and efficiently, the performance of seaport like delay time will reduce and the operation of seaport time will improve continuously. As the conclusion, the seaport quality is to ensure the progress of the seaport operation towards the objective can be carried out effectively and efficiently. The seaport quality also will help the future planning for development of seaport. Since between seaport quality and seaport performance is related, the significance of seaport quality is also will help the highlighting of the start and the cause of a congestion period, the negotiation of reduction in a port congestion surcharge as a result monitoring and documents port performance. The timely adjustment of port tariff, the provision of sound information base of the seaport planning and justification for capital development. (UNCTAD, 2005). According to the significance of seaport quality, is also related on the quality, efficiency and effectiveness of seaport operation to decide the dimension services that providing by the seaport. These components are parts of the definitive variables of rivalry in the seaports clusters to attract the customers. (Arbia Hlali & Sami Hammami, 2017).

Presently, there is difficulty in defining seaport quality due to non-universal definition of what indicates seaport quality or what seaport quality entails (Monie, 2005; Otieono, et al., 2011). Based on definition seaport and quality, it would be universal meaning for both of wording. The definition seaport quality would be related on the elements which are influencing the quality in seaport. According to this article, the definition of seaport quality will be determine and entails by the Systematic Literature Review (SLR). After determine the elements that contribute in definition seaport quality, it will be shown the significance of seaport quality towards the seaport operation for effectiveness and efficiently. The seaport operation has been

identified as a productivity to measure the seaport operation efficiently. (Tongzon & Heng, 2005; Otieono et al., 2011). According to that statement, the prior of significance of seaport quality will help and support the smoothing of the productivity in the seaport operation. As an example, the operation in the seaport, such as, ship stay, quality of cargo handling and quality service to inland transport during passage through the seaport will smoothly continuously operate when the quality of seaport is well maintained. (Budria et al., 1999; Otieono et al., 2011).

#### Case Study: Peninsular Port Malaysia versus Port Singapore

Previously, there are some studies which are refer on the port performance and seaport competitiveness. As highlighted by Ada and Chee (2007) and SalwaniArbak (2010) in relation to the topic on "Port Productivity Analysis of Container Ports in Malaysia: A DEA Approach". This paper studies on the port performance measurement of 6 container ports in Peninsular Malaysia by using the data envelopment analysis (DEA) approach. The result found that Port of Tanjung Pelepas and Johor Port emerge as the best performers when compared to the other Malaysian ports. In their analysis, both Westport and especially Northport do not perform very well because of competitive power. However, in this analysis Singapore also having the higher productivity scores. Means that, the shipper tend to go the Singapore Port although Port Klang offered the cheaper rather than Singapore Port. Based from this study there is a variance in term of port performance as showed below by using the DEA-CCR Model (Ada & Chee, 2007; SalwaniArbak, 2011):

- (i) Northport: (Productivity Score -78.63 %)
- (ii) Westport: (Productivity Score - 88.72%)
- (iii) Port Tanjung Pelepas : (Productivity Score - 89.79 %)
- (iv) Penang Port: (Productivity Score - 68.17 %)
- (v) Johor Port: (Productivity Score -100 %)
- (vi) Kuantan Port: (Productivity Score -77.05%)
- (vii) Singapore Port: (Productivity Score - 100%)

This previous study in 2007, there are analysis by DEA approach to entails the seaport performance and seaport competitiveness. Now, this article is focusing on adaption from the Port Service Quality Model by Thai (2008), the seaport quality is being study to show the importance of the seaport quality toward the improvement of seaport performance and also the seaport competitiveness. Due to significance of defining of seaport quality will guidance the flow or process of importance the seaport quality in the seaport performance and seaport competitiveness.

#### Overview of study

The globalisation of modern seaport has strongly contributed to the growth of global economy (Tae & Lee, 2016). Modern seaport is the development of fifth generation of seaports heading towards a dynamic customer-centric community (Tae & Lee, 2016). For introducing the seaport industry function, the seaport industry has many critical functions including transport, logistics, distribution, and spatial function which influences the global economic growth and determines the quality of seaport (Montwill, 2011; 2014). The spatial function refers to the space in the terminal or seaport which function as a services related to the transport, forwarding and logistics to optimize supply, which leads to the reduction in congestion and other external costs of

transport (Montwill, 2011; 2014). A case study by Lee & Lam (2015) which performed on the development of fifth generation seaports at four major container seaports in Asia including Shanghai Port, Hong Kong Port, Busan Port, and Singapore Port. The fifth generation of seaports have improved in terms of reliability and resilient systems, high-end information technology (IT) solution, sustainability of the seaport coordination, city development, and the combination of seaport cluster and maritime cluster to make them closer to the seaport users. The characteristics of fifth generation which towards the advanced technology on high-end IT solution, it is very related with industrial revolution 4.0 (IR 4.0). The characteristics of IR 4.0 is the ubiquitous connectivity of people, things and machines by the internet of things, internet of services and internet of data (Kagermaan et al., 2014; Hussain et al., 2016; Crnjac et al., 2017). Then, the characteristic IR 4.0, the evolution on fifth generation must be ahead from line with IR 4.0 for futher improvement on development of seaport industry. The development of seaport generation and IR 4.0, concludes that seaports play an important role in the economic development. This is because seaports are the nodes between the sea, land, and other countries as a form of commercial value. For example, Malaysian seaports are situated at a strategic geographical location along major shipping trade lanes, namely the Straits of Malacca and South China Sea such as Port Klang, Port Tanjung Pelepas, and Penang Port. These are the busiest ports in Malaysia.

The issue on how to define "seaport quality" is important and should be to produce an intensive understanding on seaport quality. Generally, the issues on the importance of quality will be possibly give the different views on the definition of seaport quality that be in line with the fast-paced and aggressive seaport industry. As depicted from history, the issue has been a concern since the 1980's until now. Thus, this article was conducted to determine the contribution of seaport quality to the relevant industries and organisations. The current scenario of seaport competitiveness requirements, the performance growth of neighbouring seaports, the strategic location of Malaysian seaports which are adjacent to the Straits of Malacca, together with international and domestic master plans are all highlighting the attention on seaport quality. Thus, the evolution of the generation of seaport from UNCTAD can be observed in order to identify the importance and development of seaport quality.

#### Evolution of the seaport development and relationship with quality perspective

A significant change in the development of the seaport activities would be to add value from time to time. Through seaport development, a summary of the relations with quality perspective are illustrated below (refer to Table 1). In relation with the quality perspective and seaport evolution, the organisation of seaports was being improved efficiently and more systematically, through a good and strong quality relationship between the seaport and seaport users. Besides that, the customer satisfaction highly increased because of good quality services and good performance of the seaport. From the perspective of the quality in fourth generation, the fourth and fifth generation should decrease the congestion and pollution at the seaport, as it would make the overall environment of the seaport and port cities much cleaner, more productive and maintain higher quality environments. (Montwill, 2011; 2014).

**Table 1.** Generations of seaports and perspective of seaport quality

GENERATIONS OF SEAPORTS	OF EVOLUTION OF THE FUNCTIONALITIES OF SEAPORTS	THE OVERVIEW ON QUALITY PERSPECTIVE
First generation (Prior to 1950s) Source : (UNCTAD,1992; Bereford et al., 2004)	<ul style="list-style-type: none"> <li>• Sea approach</li> <li>• Transfer of goods</li> <li>• Temporary storage</li> <li>• Delivery</li> </ul>	Quality in: <ul style="list-style-type: none"> <li>• Fast time delivery</li> <li>• Providing sufficient space.</li> <li>• Providing enough good facilities</li> <li>• Good handling on the equipment or</li> </ul>

		machinery
		<ul style="list-style-type: none"> <li>• Price acceptability</li> </ul>
Second generation (Since 1960s) Source : (UNCTAD,1992; Bereford et al., 2004)	<ul style="list-style-type: none"> <li>• Includes First Generation activities</li> <li>• Industrial and commercial activities</li> <li>• Handling and services centre</li> </ul>	Quality in: <ul style="list-style-type: none"> <li>• Including the first generation quality perspective</li> <li>• Enough equipment, space and machinery</li> <li>• New technology of machinery</li> </ul>
Third generation (Since 1980s) Source : (UNCTAD,1992; Bereford et al., 2004)	<ul style="list-style-type: none"> <li>• Includes First and Second Generation activities</li> <li>• Structuring of the port community</li> <li>• Strengthening links between town, port and port users</li> <li>• Extension of the range of services offered beyond the port boundary</li> <li>• An integrated system of data collection and processing</li> <li>• Becoming a logistics platform for trade</li> </ul>	Quality in: <ul style="list-style-type: none"> <li>• Extension of the seaport services from seaport terminal to the seaport end user.</li> <li>• Extension of the integrated system of data collection.</li> <li>• Processing in-services operation between the seaport community</li> </ul>
Fourth generation (Since 2000) Source : (Flyn et al., 2011)	<ul style="list-style-type: none"> <li>• Distribution centre</li> <li>• Network of physically separated ports (terminals) linked through common operators or through a common administration</li> </ul>	Quality in: <ul style="list-style-type: none"> <li>• Extending and improving the networking relationship between terminal and operators</li> </ul>
Fifth generation (Since 2016) Source : (Tae & Lee, 2016)	<ul style="list-style-type: none"> <li>• Port-centric logistics.</li> <li>• World-Class customer-centric services</li> </ul>	Quality in: <ul style="list-style-type: none"> <li>• Customer satisfaction</li> </ul>

### METHODOLOGICAL APPROACH

This article refers to (Tranfield et al., 2003; Hussain et al., 2017) by employing systematic literature review (SLR) through three sequential stages, including planning, execution and reporting. Figure 1 shows the systematic literature review (SLR) method that was used in this article. For the first stage, this article used the academic literature review focusing on the definition of quality and seaport from all relevant articles, journals and conference papers. In the period of 16 years, from 1990 to 2016, there were 110 journals found with focus on quality and seaport by using the Scopus search engine. (refer to the Table 3). The

foundation for the yearly classification were based on the development or evolution, and profound understanding of the main keywords which were quality and seaport. The purpose of this 16 years clarification journal was identified as the current research trends and explained the changing direction of studies on quality and seaport. Due to two decades classification on searching journal, there was an example journal related on seaport competitiveness which takes 32 years, starting from 1983 until 2014 and focusing on the academic reputation and relevance in the domain of transportation and logistics. (Francesco et al., 2016)

**Table 3.** The preliminary database of journal papers on quality and seaports

Fields	Academic Journals	1990-1999	2000-2009	2010-2016	Number of paper
<b>Journal definition of quality</b>	Journal of Quality Management	8			8
	Journal of Quality and Technology	13	8	4	25
	Journal of Total Quality Management	1			1
	Journal of Quality Improvement	1			1
	Journal of Retailing	3		1	4
	Journal of Quality Science	1			1
	Journal of Marketing	8	3	2	13
	Asia Pacific Journal of Marketing Logistics		1		1
	European Journal Marketing			1	1
	Journal of Services Marketing	1			1
	Journal of Business Economics Management		1		1
	Journal of Business Research	1			1
	Journal of Business Strategy	1			1
	International Journal of Services Industry Management		1		1
	Journal of Services Theory & Practices		2		2
Journal of Management History (Archive) Merged		1		1	
Management Decision					
Annals of Tourism Research			1		1
<b>Journal on seaports</b>	Social Behavioural Sciences		1		1
	Transport Record		1	4	5
	Transportation Economics		2	3	5
	Transportation Business and Management			1	1
	Transportation Policy			1	1
	Transportation Geography			1	1
	Transportation Research : Part A		1		1
	Transportation Review			2	2
	Transportation Research : Part E			2	2

European Transport	1	1
International Journal Reliability and Management		2
International Journal of Logistics Research & Application	1	1
Asian Journal of Shipping & Logistics		2
International Journal of Transport Economics & Policy		1
Journal of Shipping & Trade		1
Maritime Economics		2
Maritime Policy Management	1	3
International Journal of Physical Distribution & Logistics Management	1	1
Journal of Policy, Administration & Institution		2
Journal of Coastal Research		2
European Journal of Marketing		2
Social Behavioural Science		1
Competitiveness Review		2
International Journal of Scientific and Research Publications		1
International Law and Management		1
Criminology and Justice	1	1
International Journal of Management	1	1
<b>Total</b>		<b>110</b>

The main criteria on searching keywords classification was divided into two broad perspective which was on quality and seaport. The element criteria in quality and seaport were

summarized in recent 110 journal for literature research and applications as referred in Table 4.

**Table 4 .** Classification of 110 journal papers for literature on quality and seaports

Classification Criteria	Publications	(i) Quality Perspective	
<b>Definition Quality</b>	Jan (1990); Thomas (1992); (Kailash, 1991); (Lynne, 1992); (John, 1993; Fred, 1993; David, 1993); (Kaj, 1994; Ann <i>et al.</i> , 1994; Anthony & Kwok, 1994; Philipa, 1994); (Allan <i>et al.</i> , 1997; Steven, 1997; Sivakumar & Raj, 1997); (James, 1998; Wen, 1998); (Dianne, 1999; Ashok <i>et al.</i> , 1999; Jillian <i>et al.</i> , 1999; Hellos & Jacobson, 1999); (Lloyd, 2000; Raghunathan, 2000; Dwayne <i>et al.</i> , 2000; Richard & John, 2000); (Rust <i>et al.</i> , 2002); (Thomas, 2005); (Charles, 2006); (Jeroen & Albert, 2007); (Christina, 2010); (Olavur, 2011); (Willis, 2012; Golder, 2012); (Richard & Suman, 2013); (Macdonald <i>et al.</i> , 2016);		
<b>Element of Quality Improvement</b>	(Sujan, 1991); (Barbara, 1993); (Wen, 1996); (Michael & John, 1997); (Nicholas, 1999; Satish, 1999); (V. Roshan, & Wu, 2002); (Harriet & Rene, 2003); (Jeroen & Albert, 2007); (Jyeet <i>et al.</i> , 2009); (William <i>et al.</i> , 2013)		
<b>Quality Improvement</b>	(Ravi & Elizabeth, 1999)		
<b>Total Quality Management</b>	(Wolfgang, 1990); (Manus, 1999; Robert, 1999); (Patrick & Thomas, 2000); (Christina, 2010)		
<b>Service Quality</b>	(Marjorie <i>et al.</i> , 2001; Mary <i>et al.</i> 2001)		
		(ii) Seaport Perspective	
<b>Seaport</b>	(Hugh, 2000); (Ballis & Stathopoulos, 2002); (Lewis <i>et al.</i> , 2003, 2006; Elvira <i>et al.</i> , 2006; James, 2006); (Panayides and Song, 2008); (Lloyd <i>et al.</i> 2009; Photiset <i>et al.</i> , 2009; Knatzet <i>et al.</i> , 2009); (Montwill (2011, 2014; Suet <i>et al.</i> , 2011); (Meng & Anthony, 2012); (Marcella <i>et al.</i> , 2013; Rosa <i>et al.</i> , 2013); (Halkoset <i>et al.</i> , 2015); (Fernando <i>et al.</i> , 2016)		
<b>Seaport Management</b>	(Peter, 2004); (Shy, 2007); (Cheon & Deakin, 2010; Hercules, 2010; Cimen and A. Guldem, 2010; Chen <i>et al.</i> , 2010; Christophe <i>et al.</i> , 2010; K. Das and S. Sengupta, 2010; Pedro and Rui, 2010); (Mathew, 2011; Gordon <i>et al.</i> , 2011; Hai <i>et al.</i> , 2011; Michael & Melewar, 2011); (Rosa <i>et al.</i> , 2013; Michael <i>et al.</i> , 2013; Antonio <i>et al.</i> , 2013); (Bo <i>et al.</i> , 2015); (Claudia, 2016; Tony & Mary, 2016; Shuet <i>et al.</i> , 2016)		
<b>Seaport Competitiveness</b>	(Daniel, 2002; Robert, 2002); (Bratteland & Netter, 2005); (Yeo <i>et al.</i> , 2011); (Chi <i>et al.</i> , 2012); (Wan and Zhang, 2013; Wan and Zhang, 2013); (Tszet <i>et al.</i> , 2014); (Maria and Joao, 2015)		
<b>Seaport Safety and Security</b>	(Kit <i>et al.</i> , 2003); (Eski, 2011); (J. Rengamani and V. Venkatraman, 2015)		

#### Systematic Literature Review (SLR) Methodology

The summary on SLR methodology is illustrated in Figure 1. This method was important to answer the main article question of "What is seaport quality?". This method was used starting from the planning process involving 110 journals in the big scope of seaport industries' perspective. Secondly, the executing process involved 70 journals from the initial 110 journals in the first stage, which include the attributes of quality, seaport service

quality, seaport management, seaport competitiveness, seaport safety and security, seaport environment, and seaport performance. Finally, the reporting process was used to further narrow down the selection to 30 journals, using Scopus search engine to find results on defining seaport quality. The main criteria of category seaport quality is narrowed down by the definition of effectiveness, reliability and governance. Besides that, the 30 journals also narrowed down by the seaport

operations activities as a guidelines to define the definition on seaport quality. It is means that the seaport effectiveness referred to the operation of seaport, while seaport reliability

referred to the productivity of seaport and lastly seaport governance referred to the policy of the seaport.

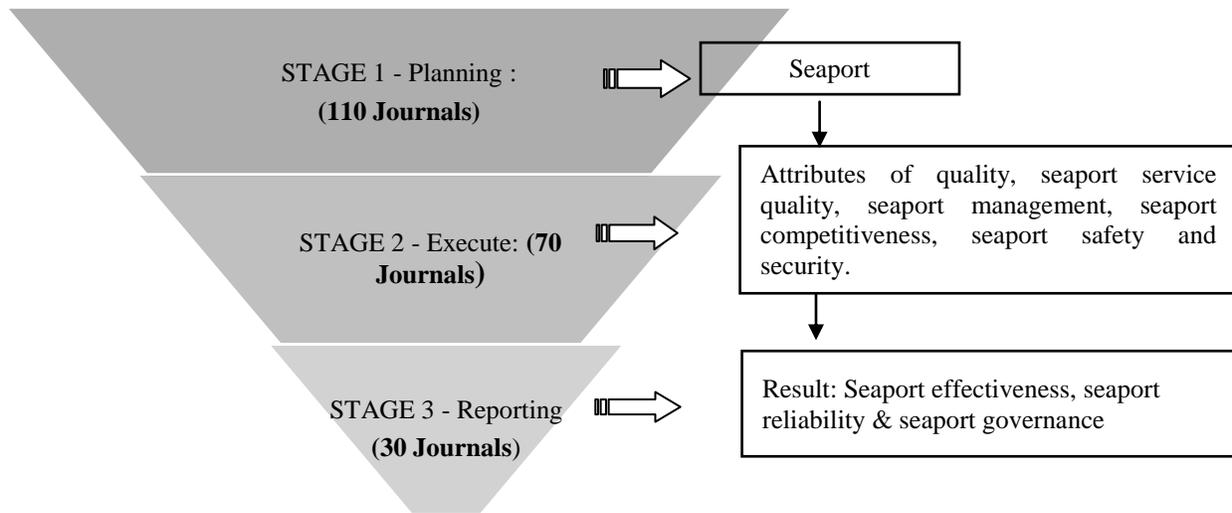


Figure 1. Summary of SLR Methodology

#### FINDINGS AND RESULTS: THE PERSPECTIVE OF SEAPORT QUALITY FROM DIFFERENT PERCEPTIONS

Quality can be defined differently since it can be viewed through many perspectives, such as management, education, manufacturing and policy. Since the 1990's, Coulson et al. (1990) has distributed questionnaires and conducted interviews with the organizations and found that the majority of Chief Executive Officers (CEOs) are concerned about quality. They stressed that an increase in customers is dependent on quality and reliability. The article has pointed out that those who do not abide to quality benchmarks will not be able to last long in the trading business, because upholding quality allows an organization with a goal or objective to improve the performance of their organization. For example, in the seaport industry, any transshipment or transloading should operate quickly without any damage to the cargo. From that, we can see that the quality of handling machines and equipments needs to be managed efficiently and effectively, as well as the quality of staff that operate the machines.

Besides that, quality refers to the long-term action of ensuring upkeep of standards in order to survive in the industry, to ensure that the goals of an organization are achieved, and to be capable of competing in future challenges. Additionally, the findings are also concerned about the quality of the products, attitudes, values, and other tangible factors. One of the chairmen came out with a drug analogy on quality, stating "At first it works, but then the effect wears off. You get used to it and have to take extra doses or take something else to make an impact". It means that the quality must be continuous from time to time in order to establish the best implications to the industry or organisations. Referring to a similar situation in the seaport industry, continuous improvement in seaport quality is important in giving positive implications and also to ensure that the seaport sustains itself as a dynamic industry.

There is no specific terminology on defining quality (Kara et al., 2005; Crosby, 2006). However, their opinion in the interpretation of the quality is according to the perception from different expertise. From the experts in issues of quality perception, the quality define as the expectation from the client after providing the services to them (Lopez & Poole, 1998). From systematically (Gonzales, 2012). Broadening the quality concept can assist in the management of the customers' emotions,

that statement, it was explained that the industry, organisation, or company must find "who is the client?" which involves quality improvement. This is because when we know who our client is, what they need and their expectations can be identified. The importance of this can be related to the seaport quality of giving priority to customer satisfaction, in order for seaports to perform well.

Harvey & Green (1993) defines quality perception as the main cause to influence the processes or outcomes in organisations. This can be applied in the seaport industry as guidelines to improve the seaport quality as seaports which have a number of different clients. Depending on the perception of quality by each individual client, this will influence the performance rating of the seaport. Other than that, Harvey & Green (1993) have also revealed five discrete values of quality, namely, as exceptional, perfection or consistency, fitness for purpose, value, and transformative. Referring to these five discrete values that have been used in higher education, they can also be applied for seaports, where the quality is related to customer satisfaction. They also play an important role in the seaport industry to ensure continuous improvement of seaport performance.

The definition of quality in the perspective of integrative quality framework which comprises of three processes (Gonzales, 2012). The first process is the quality production process, the second process is the quality experience process, while the third process is the quality evaluation process. From this authors' presentation, integrative quality framework describes how the firms and customers produced quality, how firms delivered and how customers experienced quality and finally how customers evaluate quality. The characteristics of the component of quality refer to the performance and reliability. (Gonzales, 2012). The definition of performance of that paper is the level of functionality of the product or service, while the reliability refers to the probability of the products' or services' success with the level of the functionality.

The integrated framework practice combines the three processes and broadens this concept into the quality framework. From the combination of these three processes, the customer satisfaction will be improved and the customer feedback can be managed providing rationale to customers when they are involved in the quality experience process and quality evaluation process.

Another implication of the broadening of the concept in quality framework is the management of trades-off in the selection of product or services. This implication allows customers to be more observant of the universal product or services and the firm would be able to offer the best universal product or services. Besides that, the firms can also help to motivate the customers to improve their knowledge on the product or services itself. Through the explanation by Gonzales et al. (2012), it can be related with the seaport industry which rely on providing services for the seaport users, and from that we can extract the customer needs and wants for increasing seaport quality.

The level of seaport performance can be measured by customer satisfaction. Because the relationship between seaport quality and seaport performance is strong, the best quality services provided by the seaport will influence the customer to choose the seaport as the best provider. It also would increase the income of the seaport, which can be seen through Singapore Seaport's performance.(UNCTAD, 2016). They rose through the world's rankings by providing fast services and incorporating new technology to satisfy customers, thereby increasing their own performance. The other main criticisms of quality of service include improving organisation and focus, increasing the availability of services provided within the seaport area, improving performance speeds of service ships and cargo, improving reliability including consistency of port performance, and finally introducing more flexibility, such as providing alternative solutions when mistakes happen (Panteia et al., 2014). On the other hand, the quality is a relative concept and that it is socially and market driven (Thai, 2008). It relates to stakeholder's real needs implied and expressed in seaport operations and management actions. The search to demonstrate quality and safety in the maritime transportation services and seaports, in particular, has quite a long history (Constantinos et

al., 2011). As far as quality is concerned, seaports are indeed an important part of the maritime transport chain.

The seaport services quality is also related with seven components, including efficiency in seaport services provision, environmental awareness, safety, security, seaport users' satisfaction, timeliness, and seaport infrastructures (Vaggelas, 2016). From that viewpoint, if the organisations are more concerned with the operation processes in the seaport, these seven components of the seaport quality and performance would improve and become more competitive. The importance of seaport quality is critical because of the contemporary seaport industry's extremely competitive in nature. Hence, seaport quality is an integral part of seaport competitiveness. Besides that, the importance of the seaport quality due to issues regarding safety, security, and environmental concerns have gained more attention than from other perspectives. From another point of view, the nature of oligopolistic on several shipping markets has created an immense pressure to seaports and consequently this industry has to show substantial concern on its quality aspect, in order to improve their image attractiveness among users.

#### Findings and results on definition of seaport quality

After considering opinions from other perspectives regarding the definition of seaport, quality, effectiveness, reliability and governance, the definition can be categorized into three categories, including seaport effectiveness, seaport reliability and seaport governance (refer to Figure 2). The categories were developed from overall elements in Stage 2, involving the attributes of quality, seaport service quality, seaport management, seaport competitiveness, seaport safety & security, seaport environmental, seaport performance which influenced the overall seaport quality (refer to Figure 2).

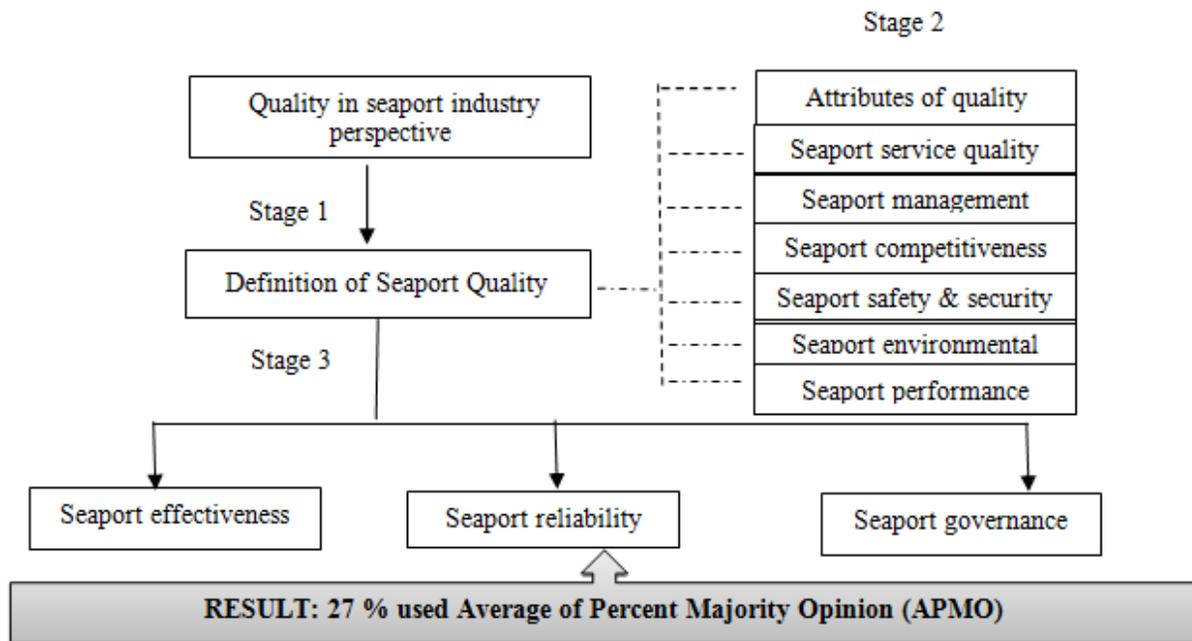


Figure 2. Summary of SLR

#### DISCUSSION

Referring to (Ding et al., 2016), there were seven criteria of seaport services quality, which are service effectiveness, reliability of seaport services, totality of providing seaport services, increasing the efficiency of core logistics activities, seaport pricing, reducing the time of non-value-added activities respectively. From (Brooks & Schellinck, 2015), the article was

closely similar to (Ding et al., 2016), however the former's article paper categorises the five most important criteria, which are accessibility to seaport premises, overall reliability of the seaport, provision of adequate on-time information, incidence of delays and seaport security.

However on the topic of seaport reliability, (Tae *et al.*, 2015) stated that seaport reliability is related with the resources used by the port, such as the reliability of the equipment and facilities, the reliability of using modern machinery and proper equipment, having stable and strong finances, and others. (Tae *et al.*, 2015) also found that the element of responsiveness in operations and the cooperation between the community of seaports were also influencing the seaport reliability. Whereas on the topic of seaport governance, (Geiger *et al.*, 2011; Guilherme *et al.*, 2014) states the three elements of seaport governance. Firstly is structure, which refers to the regulator framework, secondly is actions, which refers to the degree of coordination, and thirdly is elements, which refers to the degree of efficiency of management of flows and information. Referring to the three stages in the method on systematic literature review (SLR), seaport quality can now be more clearly understood, and is easily available for

other researchers to review as well as use this definition of seaport quality as a reference and guideline. The final results are accumulated by using Average of Percentage Majority Opinion (APMO), supported by (Heiko, 2012) who used this method to find the first calculative percentage of the disagreement and agreements for every statement. From the APMO method, this article found that only 27 percent from 110 journals is related to the seaport quality.

#### Summary of definition of seaport quality

Referring to the final result, whereby this article defined seaport quality in three categories, which are seaport effectiveness, seaport reliability and seaport governance. For further clarification, there are some related journals on the definition of seaport quality as depicted below (refer to the Table 5):

**Table 5.** Summary on relevant journals for definition of seaport quality

Items	Author & Year	Summary on seaport quality perception
<b>Seaport Effectiveness</b>	(Cuadrado <i>et al.</i> , 2004)	<ul style="list-style-type: none"> <li>Quality Services refer to the three categories as below; provision of infrastructure, coordination of logistics chain, adaption of services to clients' demand which refers to timeliness, cost acceptability on services and safety cargo services</li> </ul>
	(Tran <i>et al.</i> , 2012)	<ul style="list-style-type: none"> <li>This article proposed the quality management for contemporary seaport on internal and external dimensions shown as below; (Internal Dimension) : leadership, customer focus, human resources, quality measurement, process management continuous improvement, training and educational and social benefits; (External Dimension) quality integration , information and technology, network optimisation and quality culture</li> </ul>
	(Thai, 2015)	<ul style="list-style-type: none"> <li>Six quality dimensions refers to the resources, outcomes, process, management, image/reputation and social responsibility</li> </ul>
	(Brooks <i>et al.</i> , 2015)	<ul style="list-style-type: none"> <li>Quality involves the effectiveness of accessibility to seaport premises, reducing delays of cargo delivery, and improving seaport security</li> </ul>
	(Shadi Alghaffari <i>et al.</i> , 2016)	<ul style="list-style-type: none"> <li>Quality involves the effectiveness of organisational management including the degree of professionalism, the autonomy of management, leadership by handling administration and initiation/innovation in organisational management</li> </ul>
<b>Seaport Reliability</b>	(Arabelen <i>et al.</i> , 2012)	<ul style="list-style-type: none"> <li>Five-factor structure was produced; First factor: quick response to seaport user needs, quality of customs clearance, speed of service, level of obstruction encountered within the seaport services given and flexibility level when satisfying customers, in other words, seaport users; Second factor: frequency of ship visits, seaport infrastructure, superstructure, facilities and seaport user, closeness to the seaport; Third factor: shipment availability, quality seaport, handling equipment and time of delivery; Fourth Factor: frequency of damage/loss of cargo, convenience of pickup, accessible seaport location and facilities, access to information; Fifth Factor: suitable seaport location and facilities, availability of enough seaport stockyard (container yards and backup facilities)</li> </ul>
	(Yeo <i>et al.</i> , 2015)	<ul style="list-style-type: none"> <li>Seaport reliability is related to resources, responsiveness, cooperation, outcome and process</li> </ul>
	(Geiger, 2011)	<ul style="list-style-type: none"> <li>Seaport governance refers to the structure of organisations in the regulatory framework. Actions is related to the degree of coordination between the seaport user and the element of efficiency in the flow of giving management information</li> </ul>
<b>Seaport governance</b>	(Guilherme <i>et al.</i> , 2014)	<ul style="list-style-type: none"> <li>Seaport governance refers to the changes in structure of organisations, changes of governance structure, standardization of the regulation and rules in seaport operations and changes of seaport policy</li> <li>Other than that, seaport devolution processes, guidelines of processes involved in the seaport and the management processes</li> </ul>

This summary on the definition of seaport quality based on existing papers on seaport quality contributes to an understanding of what seaport quality is. Three conceptually different perspectives on seaport clusters have been distinguished – those that define a seaport quality as a seaport effectiveness based on quality of services, organizational management, effective coordination of logistics chain, safety and security manner, and provision of infrastructure; those that define it as reliability of services based on customer satisfaction, seaport location and infrastructure, short delivery time, and

harmonization of communication and information; and those that define it as a governance in the seaport cluster by standardization of law and policy. This review provides several significant contributions to the theoretical and practical understanding of seaport quality.

#### CONCLUSION

The concept of seaport quality has emerged at a time when policies have focused on promoting innovation and competitiveness in different industries. In terms of policy

advice, a seaport quality approach can provide decision makers with a broader view on how to serve supporting dynamics of the market, and encourage knowledge exchange among players in the maritime industry. Seaport quality can serve as a useful framework to strengthen the collaboration among the seaport cluster. In conclusion, this article has reviewed the existing article on seaport quality and contributed to improving the understanding of "what is seaport quality?". The main finding of seaport quality definition in this article indicates that seaport quality is a very broad subject to define. However, from the application of SLR method to extract definitions of seaport quality from previous literatures, the definitions can be categorised into three categories which include seaport effectiveness, seaport reliability, and seaport governance. The elements of the seaport quality will be used to evaluate the quality level of seaport industry. Other than that, the contribution of this article would be to educate seaport operators, clients and their respective stakeholders to understand clearly about seaport quality. It will serve as a guideline to the seaport community to improve their quality in each element and also help to enhance seaport performance.

Furthermore, for future article on seaport quality, exploration can be made on the three categories that have been revealed in this article, namely seaport effectiveness, seaport reliability and seaport governance. By using APMO result, 27 percent of 110 journals was found on the relevant field, which focuses on seaport quality for reference. From the 27 percent, limited references on seaport quality was the major limitation in this article. The future article will focus on the contributing factors as indicators on developing Malaysian seaport competitiveness, and also analysing the impact of seaport quality on Malaysian seaports, with aims to make local seaports as efficient and effective platforms for the nation's economic growth.

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