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# Applying and Promoting the Seaport Quality System (SQS) and Spatial Interaction Model (SIM) for the Sustainable Development of the Recreational Seaport Industry in Malaysia

*Mohamad Rosni Othman, Jagan Jeevan,  
Nurul Haqimin Salleh and Noor Azwa Noralam*

## Abstract

The recreational seaport industry carries out many critical functions, including transport circulation, logistics, commercial, and spatial ones. They influence local economic growth and determine the quality of recreational seaport. However, the definition of recreational seaport quality has remained elusive among the community, at present. Hence, this chapter explores the current literature by using the Systematic Literature Review (SLR) to derive at the definition of seaport quality based on three categories: seaport effectiveness, seaport reliability, and seaport governance, which will be main pillars for the development of marinas. This chapter proposes the Seaport Quality System (SQS) and Spatial Interaction Model (SIM) as a way to develop approaches and strategies that support sustainable planning and management of recreational seaports and marinas in countries with extensive coastlines. It is proposed that in order to offer sustainable and quality services, marinas must adopt the SQS model based on identifying and managing quality and risks. In addition, SIM can be utilised to improve the marinas operations by adopting key components in cruise activities, economic corridors and seaport regionalisation. The combination of both models are essential to enhance the growth momentum of marinas in this country.

**Keywords:** recreational seaport, seaport quality system (SQS), sustainable development

## 1. Introduction

Tourism plays a vital role in Malaysia's economy. Many plans and programmes have been implemented in Malaysia over the years to develop tourism and recreational activities in places like Langkawi, Perhentian and Redang Island [1]. Owing to limited capacity and regulations to explore seaport tourism, it has been suggested

that seaport tourism makes full use of facilities in seaport, especially from the perspective of ‘Portscape’. ‘Portscape’ is defined as the collective visual imprints of the build environment and nature sceneries at seaports, which can be used as a marketing/promotion tool to boost regional economic development through this specific form of tourism activity [1].

The significance of seaport tourism would be improving the quality and performance of both industries: seaport and tourism. The SQS model and certified quality management systems can be used to strengthen seaport tourism for economic prosperity. The total contribution of the tourism industry to Malaysia’s Gross Domestic Product (GDP) from 2007 to 2019 did not exceed 2% [1]. This calls for a thorough investigation to improve the contribution of this core service sector to the nation’s GDP.

The status of seaport is now heading towards the sixth generation (6GP). Its evolution is prompted by advancements in information technology (IT) and innovation in the transportation industry. The ballooning of shipping capacities to 50,000 TEU megaships in the future, for instance, will probably cause a shift of cargoes between seaports to those able to handle huge vessels and significantly larger cargo traffic on the land side [2]. From the Malaysian seaport industry perspective, embracing 6GP can be initiated by using the seaport infrastructure for seaport tourism. Hence, the primary aim of this chapter is to propose ways to improve the performance of seaports in Malaysia in terms of efficiency from different perspectives.

A good practice to observe in order to develop seaport activities is to add value from time to time. In terms of quality services and the creation of a systematic and efficient organisation, for example, one good way is to nurture a strong relationship between seaport owners and its users. Good quality services and overall performance will most likely be good for the customer satisfaction index, too. In comparison with offerings from the fourth and fifth generations, the 6GP will lead to less congestion and pollution at seaports. This will lead to a healthier environment around seaports and port cities overall. In fact, it might even improve productivity [3, 4].

Existing literature notes that the quality of seaport is distinguished by three categories: seaport effectiveness, seaport reliability and seaport governance [5].

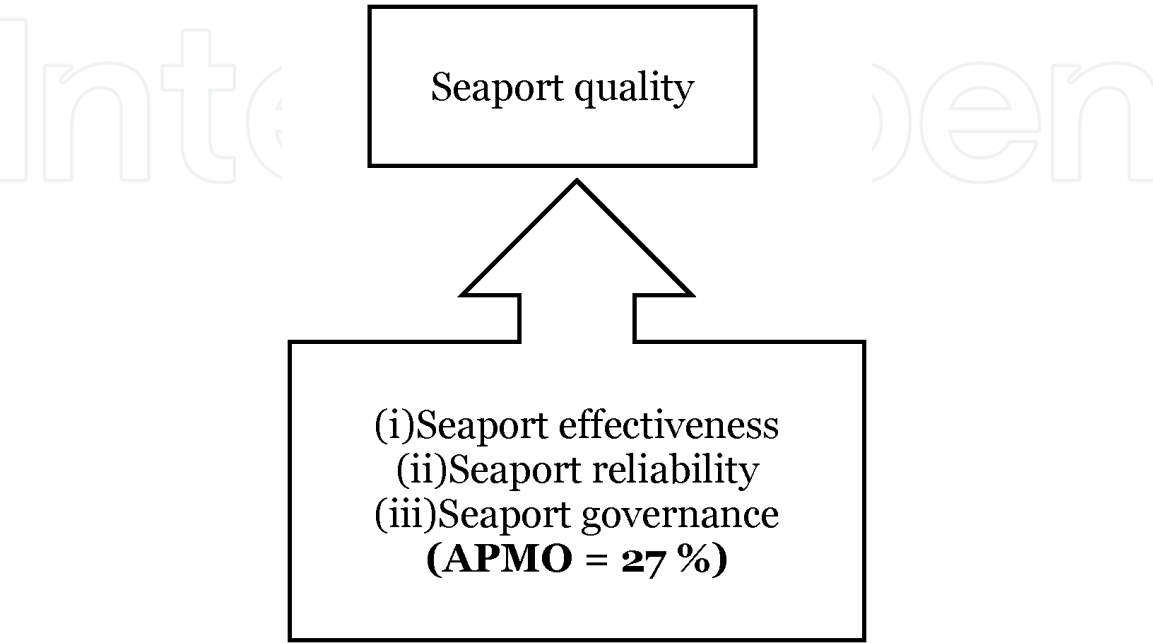


Figure 1.  
Overview of SQS model by SLR approach [6].

Chapter	Proposed ISO 31000:2009 Clause Number	Chapter	Existing ISO 9001:2015 Clause Number	Risk + quality NewModule (seaport quality system—SQS)
1	Scope	1	Scope	This standard specifies requirements, principles and generic guidelines for a quality management system and risk management.
2	Terms and Definition	3	Terms and Condition	For the purpose of this document, the terms and definitions given in ISO 9001:2015 and ISO 31000:2009 apply.
3	Principles		None	For quality-risk management to be effective, an organisation should at all levels comply with the principles of ISO 31000:2009.
4	Framework	4	Context of the organisation	Using a framework to assist the organisation to integrate quality-risk management into its overall management system.
	None	5	Leadership	Top management of all departments in an organisation shall demonstrate leadership, commitment and be responsible for every decision making. Brainstorming is the best way to decide what is best for the organisation.
	None	6	Planning	When planning for quality-risk management, the organisation shall use the issues referred to in Chapter 4.
	None	7	Support	Internal and external communications and also reporting mechanisms are needed for the establishment, implementation, maintenance and continual improvement of quality-risk management based on Chapter 7 of the ISO 9001.
	None	8	Operations	Related to the ongoing management process based on framework and context of the organisation as stipulated in Chapter 4 of the ISO 31000 and ISO 9001 and daily activities of the organisation.
5	Process	9 & 10	Performance evaluation & improvement	Consists of ongoing evaluations to ensure controls are functioning as designed and taking corrective actions to enhance control activities, if needed. Risk assessment relates to the organisations' process of evaluating the impact and likelihood of events and prioritising related risks based on Chapter 5 (ISO 31000) and combination of Chapter 9 and 10 (ISO 9001).

**Table 1.**  
*Integration of the SQS model and certified risk management.*

The identification of this quality has been determined using the SLR approach. By using the Average of Percentage Majority Opinion (APMO) result, 27% of 110 relevant journals sourced focused on seaport quality for reference (**Figure 1**).

However, from these 27%, limited references on seaport quality constitute the major limitation of this chapter. This chapter will focus on the contributing factors, as indicators to develop Malaysian seaport competitiveness and also to analyse the impact of seaport quality on Malaysian seaports. The aims are to make local seaports as efficient and effective as possible to aid the nation's economic growth. This concept of seaport quality can be merged with seaport tourism to promote and innovate competitiveness in the industry. Exploring standardised seaport tourism policies will strengthen networking among seaport cluster in the maritime industry. This can be done by collaborating and cooperating to achieve the goals of promoting seaport tourism. Networking will also serve as an efficient and effective solution for the good of the nation's economy. This fact is supported by the Malaysian Trade Statistics' volume trade published in 2017. The volume trade witnessed a growth of 1.5% in this region, from 1.463tn in 2015 to 1.485tn in 2016 [5].

1.1 Integration SQS model and risk quality management systems

**Table 1** shows the integration of the SQS model and certified risk management system. The integration of both elements—SQS model and risk management system—will reveal and create a new module for seaport tourism by extending the existing standard that can be used in the recreational seaport management of tourism. The ISO 31000 focuses on minimising deviations from objectives, while ISO 9001 focuses on maximising achieving customer requirement specifications [7, 8].

2. Maritime tourism in Malaysia

In the challenging, modern lifestyles, stress has emerged, especially from continual demands to meet basic needs, increasing demands in the workplace as well as difficulties in personnel relationships. In general, tourism can be defined as activities of people travelling to and staying in places outside their usual environments for leisure, business or other purposes for not more than one consecutive year. Therefore, tourism has become a competitive and dynamic sector that entails the capacity of adaptability towards changes in customers' demand, level of satisfaction, availability of safety procedures, and variations of enjoyment levels among tourists.

Malaysia has a total coastline of 4675 kilometres (2905 miles), where the one in Peninsular Malaysia spans 2068 kilometres (1285 miles) while East Malaysia has 2607 kilometres (1620 miles). These coastlines have the potential for the development of new marinas to cater to the increasing demand for marine-tourism activities. However, its development was deemed not competitive by Parliament on August 15, 2018. Due to competition, the SQS model, together with the certified quality management system, has been suggested to achieve a high standard in water quality, pollution, prevention, safety and security.

Malaysia offers a wide range of cultural activities, natural heritage and leisure activities. As indicated in **Table 2**, based on statistics from the Economic Planning Unit (EPU) 2016, the total value of the Malaysian Gross Domestic Product (GDP) showcases an increasing trend from 2007 (841.36 billion) to 2015 (1287.97 billion) [9]. However, contributions from the tourism industry to the GDP indicate the opposite trend on average—declining from 1.94% in 2007 to 1.48% in 2015. However, contributions from the tourism sector did encounter positive developments along the way, especially in 2009, 2013 and 2015. On the other hand, this



Year (s)	Total gross domestic product (MYR billion)	GDP of tourism (MYR million)	Contribution of tourism in GDP (%)	Changes of the tourism in GDP
2007	841.36	16.4	1.94%	—
2008	1003.33	12.7	1.26%	−0.68%
2009	879.22	13.4	1.52%	+0.26%
2010	1108.57	13.1	1.18%	−0.34%
2011	1295.18	12.7	0.98%	−0.2%
2012	1366.58	13.0	0.95%	−0.3%
2013	1405.26	13.7	0.97%	+0.2%
2014	1687.07	14.2	0.84%	−0.13%
2015	1287.92	13.5	1.48%	+0.64%

Source: Adapted from EPU [9].

**Table 2.**  
*Total revenue of Malaysian tourism industry (2007–2015).*

industry faced downfalls in 2008, 2010, 2011, 2012 and 2014, for instance. In a nutshell, contributions from the tourism sector are not significant. On the average, its contribution is about 1.23% only annually.

Momentous innovation is required in the tourism industry to boosts its contribution to be equivalent to industries such as mining and quarrying (98.2 MYR billion in 2016), agriculture (93.6 MYR billion in 2016), manufacturing (254.2 MYR billion in 2016), construction (50.4 MYR billion in 2016) and other services (MYR 594.0 billion in 2016) [10]. In comparison, the number of tourists embarking and disembarking in Europeans seaports totalled more than 400 million in 2016 (Eurostat 2017). However, in Malaysia, only about 6,841,493 passengers were recorded at Malaysian seaports in 2016 [10]. Unfortunately, the number of tourists arriving at Malaysian terminals has declined substantially in recent years. For example, the number of tourists/passengers handled in 2010 was 18,968,152, but it plummeted to 7,257,803 in 2015 [10]. Based on this scenario, this chapter proposes turning recreational seaport into a new cluster in the maritime business. This is done by unveiling its growth prospects that can enhance its contributions to the national GDP through the adoption of the SQS model. In addition, this chapter will explore the opportunities to assimilate seaport and the tourism sector that can, together, bring benefits to the country.

The development of recreational seaports has become increasingly important for Malaysia due to the very strategic and competitive geographical position within the region, which already has thriving maritime clusters located in neighbouring countries such as Indonesia, Thailand, Singapore, Brunei, Vietnam and the Philippines. Since Malaysia has a total coastline of 4675 kilometres (2905 miles)—comprising 2068 kilometres (1285 miles) in the peninsula and 2607 kilometres (1620 miles) in East Malaysia; it, thus, possess the potential to create new marinas to cater to the increasing demand for marine-tourism activities. So far, Malaysia has developed nine public marinas (see **Figure 2**) that can be used to promote marine-tourism activities. However, based on the audit findings reported to Parliament in 2018, these public marinas are not competitive. To be competitive, public marinas should have quality management by applying the SQS model, paying special attention to the possibility of achieving a certified quality and risk management system based on high standards in water quality, pollution prevention, safety and security.

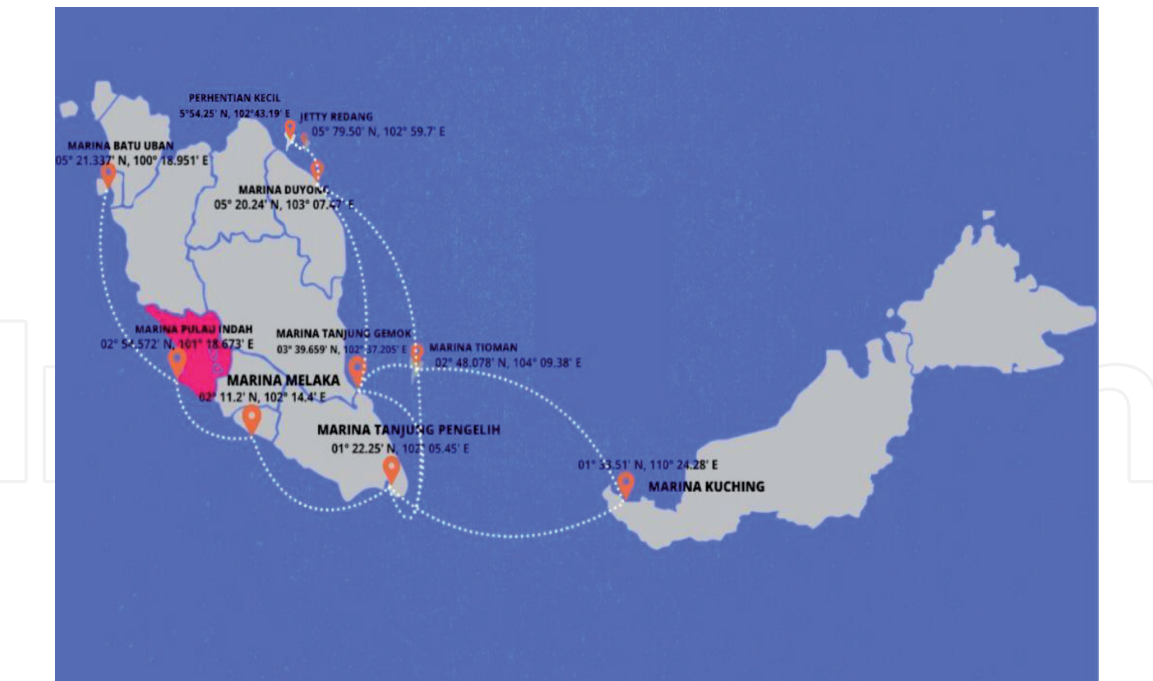


Figure 2.  
Location of the Malaysian public marinas [11].

3. Methodological approach and conceptual framework

Firstly, this research paper uses the Systematic Literature Review (SLR) to carry out its work through a three-stage procedure: planning, execution and reporting. [12]. The first stage focuses on using academic literature reviews that focuses on seaport quality. This stage also identified all relevant articles, journals and conference papers that touched on seaport qualities, such as management, social and policies. The second stage of this research categorised all the articles, journals and conference papers into three categories: seaport effectiveness, seaport reliability and seaport governance. This is done by summarising the relevant items in each category.

Next comes the introduction of the SQS model to do systematic analyses that aim to protect the natural environment in the marinas. The integration of the SQS model, ISO standard and recreational activities forms the basis for the expert’s platform that will serve as the future systematic and sustainable development of the marinas, incorporating the knowledge and experience gained from the implementation of environmental certification, such as ISO standard (see Figure 3).

$$\text{SQS Model} + \text{ISO standard} + \text{Recreational activities (Development Marina)} = \text{Seaport tourism}$$

Figure 3.  
Summary of integration of the model and tools for seaport tourism. Source: Authors.

4. Findings and result

According to Table 1, the integration of the SQS model and certified risk management can be adopted for the recreational seaport management. In addition, the SQS module is the risk and quality management system that can be used for training purposes (Table 3). The content of this module in the sample SQS model of risk management and total quality management (TQM) must be linked together

Chapter	Content	New module: seaport tourism
1	Scope	Scope of this module must be extended to recreational activities like marine environmental protection.
2	Terms and definitions	Terms and definitions of recreational activities must be extended towards seaport tourism
3	Normative reference	According to this chapter, the quality-risk management should extend to the risks of recreational activities, such as safety and security of tourists, and comply with the principles of ISO 31000:2009.
4	Principles	The recreational activities framework must be adopted in this chapter to assist and integrate towards the overall quality-risk management.
5	Framework	Integrate the three tools of the SQS model, certified risk management and seaport tourism. Using this tool to extend the new model of quality risk management in seaport tourism.
6	Management board	The participation of top management to demonstrate leadership, commitment and responsibility to decide the best way to achieve the goals of seaport tourism.
7	Planning	The implementation, maintenance and continual improvement of quality-risk management based on Chapter 7 of ISO 9001 must be well-planned through the reporting system and also via efficient internal and external communication networking.
8	Operations	The context of organisation, as stipulated in Chapter 4 of ISO 31000 and ISO 9001, and the daily activities must be related to the seaport tourism management process based on framework and organisation.
9	Performance evaluation	The corrective actions of the evaluation must be done and linked together with the objectives of seaport tourism, such as risk assessment, whereby they relate to the organisation's process of seaport tourism.
10	Continual Improvement	Continual improvements must be pursued to improve seaport tourism

**Table 3.**  
*The new model of seaport tourism [7, 8].*

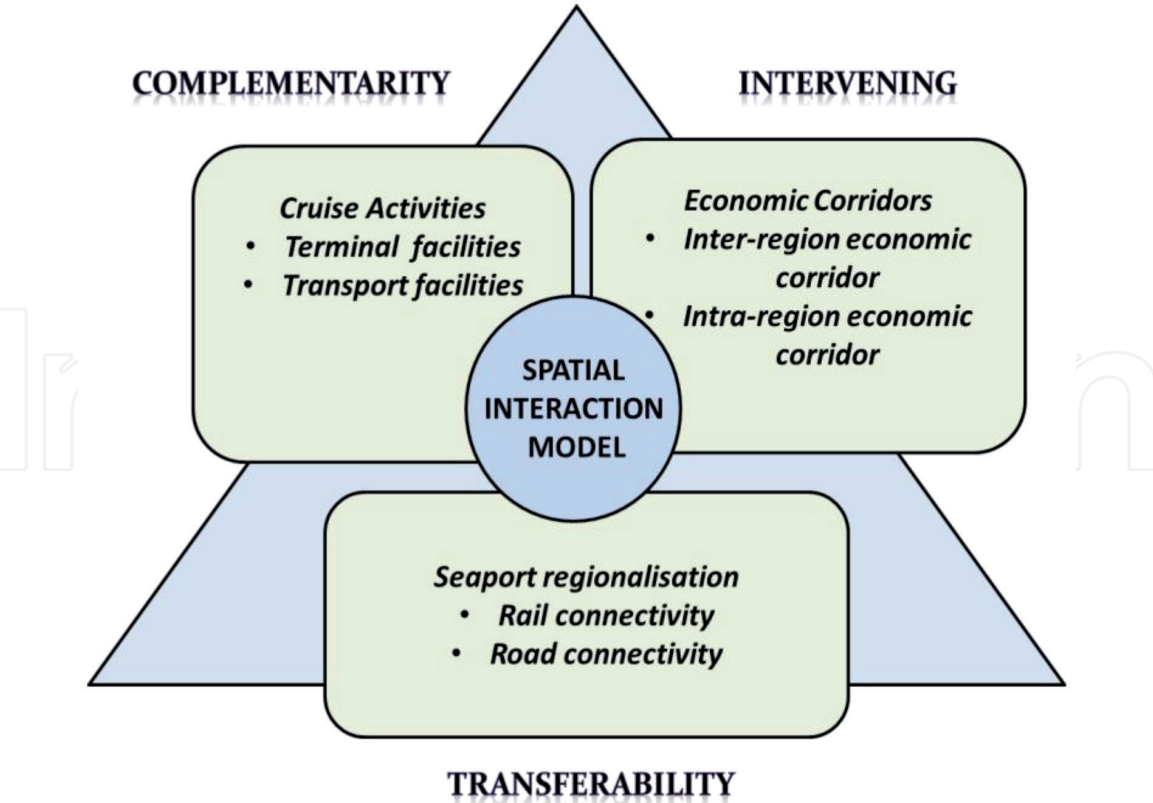
with the recreational activities at marinas to protect the marine environment. The determination of influential factors, comprising seaport effectiveness, seaport reliability and seaport governance, must involve certified risk management in seaport tourism for achieving the quality of seaports.

### 5. Spatial interaction model to boost seaport tourism

Besides providing a thorough definition of seaport quality corresponding to tourism, the application of Spatial Interaction Model (SIM) is also proposed to infuse the theoretical notion in seaport tourism because this specific model has been applied in tourism and leisure, including trade activities [1]. This model is being proposed because of its capability to incorporate cruise activities, economic corridors and seaport regionalisation. SIM is effective for seaport tourism research due to its aptitude to explore, analyse, explain and summarise ergonomic mobility, goods and information over space (**Figure 4**).

In general, marinas are related to coastal tourism, and their importance is their potential to dramatically increase economic revenue. In contrast, the concept of marinas in Malaysia remains underutilised. Hence, the application of SIM to assist SQS is very much needed. Three main components in SIM can be utilised to boost marinas' operations that are closely connected to seaports. For example, distance





**Figure 4.**  
*Spatial interaction model in Malaysian seaport tourism [1].*

of the location (complementary), travelling cost (transferability) and accessibility (intervening) can be utilised for the development of this new agenda in Malaysian seaport tourism.

In Malaysia, cruise tourism is one of the National Key Economic Area (NKEA) with the aim to increase the number of tourists to Malaysia. Currently, Penang, Langkawi, Port Klang, Malacca, Sabah and Sarawak are where some of the seaports can be found. They operate dedicated cruise terminals in their respective areas, but these terminals and transport facilities need to be improved to ensure they operate effectively. For example, providing additional facilities for immigration clearance and allocating separate passenger gate and guided by highly trained workforce will enhance the safety procedures at seaports. These will increase the potential of these venues to be the hub for tourism activities. For example, cruise terminals at Klang and Penang in Malaysian are supported by adequate terminal facilities. However, cruise terminals at Kuantan, Bintulu and Kota Kinabalu are not fulfilled by complete terminal facilities. In addition, in terms of transport facilities, all cruise terminals need to be provided prior notice before berthing and no berthing facility provided in Bintulu cruise terminal. These conditions limit the marketability of Malaysian tourism industry in selective area. In that case, it will affect the growth of marinas in these regions.

Northern, Central, Southern and East coast freight corridors are main intra-region economic corridors in Malaysia. All these corridors are connected to main seaports and inland facilities. All these corridors are well connected to all regions in Peninsular Malaysia, and in total, about USD 767 million have been invested to boost tourism and other related activities, such as agriculture, logistics, capital development and others. The development of rail linkage and introduction of second bridge in Penang Island have great possibility to enhance the seaport tourism especially in Kuala Kedah and Penang Port. Currently, inefficient rail network for passenger transportation and critical congestion at Penang bridge in northern

corridor limit the growth of marina's industry in this region. The central is well equipped with infrastructure which can be utilised for marinas development. However, over congestion and overuse of existing facilities reduce the attractiveness of the tourism venues in this region. Therefore, utilisation of alternative transport network especially rail is essential for the enhancement of Malaysian marinas. The rail network is very important to connect the tourist and the tourist attractive places. In the Eastern Corridor, there are some attractive tourist spots including Lake Chini, Teluk Chempedak and Cameron Highlands. Although extensive road connectivity is available along this corridor, the absence of rail link limits potential venues to be explored especially in Terengganu and Kelantan which are main tourist spot in this corridor.

On the other hand, there are also three inter-regional freight corridors, comprising Malaysia, Thailand, Singapore, Indonesia and Brunei. This includes the Indonesia-Malaysia-Thailand Growth Triangle (IMT-GT), Indonesia-Malaysian seaports as a hub for tourism activities, Malaysia-Singapore Growth Triangle (IMS-GT) and the Brunei-Indonesia-Malaysia-Philippines-East Asean Growth Area (BIMP-EAGA). These national and international freight corridors can be used to boost marinas in Malaysia by offering attractive promotional packages. Enhancing short-sea shipping (SSS) between the participating countries will also introduce the availability of attractive places and also enhance seaport tourism activities and increase the fascinating roles of seaports in the country. The land bridge system and road network between Thailand and Malaysia allows the manufacturers from Thailand to travel between these countries. The emergence of IMT-GT has potential to improve cross border tourist movement between Malaysia, Thailand and Indonesia. The northern region of Malaysia has strong potential to generate a high volume of tourist from this network which will be beneficial for Malaysian GDP because of its location adjacent to the southern Thailand and Indonesia. Therefore, the marinas especially in Penang and Klang have a great advantage and manage to provide significant connection for the leisure activities to the tourist.

Seaport regionalisation represents a different dimension in seaport development, whereby the efficiency of a seaport system is determined by the integration of the inland freight distribution system [1]. Currently, limited coverage of rail network reduces the opportunity for tourists from neighbouring countries to enjoy the beauty of marinas in Malaysia. Besides SSS, inland transportation plays an important role in enhancing the connectedness to marinas from various locations. This is because limited access to the inland from seaports limits the progress of the tourism sector and preventing the development of seaport tourism in Malaysia. Limited transport connectivity between the different states in Malaysia affects the complementary, transferability and the intervening during access from seaport towards inland, and vice versa.

## **6. Implications and conclusion**

Recreational seaport capacity utilisation is one of the indicators that must be considered seriously in managing recreational seaport. This is because underutilisation of existing capacities will affect internal operations and, at the same time, obstructs the external network, such as logistics. The integrated approach of quality risk management is facilitated by the fact that ISO 31000 and TQM standards have elements and common principles. The Integrated Risk Management and TQM that is collectively called the Seaport Quality System (SQS) is a sustainability stimulus for recreational seaport. The implementation of the Integrated Risk Management and TQM module on recreational seaport can help bring about quality products

and/or services. The SQS model is required to interrelate all stakeholders in the recreational seaport (internally & externally) sector. The SQS model places emphasis on customer (internal & external) orientations and involves all recreational seaport units. It requires the active involvement and empowerment of staff and is based on a long-term commitment to the continuous improvement of the management paradigm.

If the Malaysian government merely continues to increase capital expenditure to improve recreational seaport annually, the end result will be dismal. It will have limited positive impact on the recreational seaport attractiveness. Rather than allocating large amount of money solely for capacity expansion in recreational seaport, the same amount should be used to enhance the quality of management and embed the quality culture in the recreational seaport management and operations. Thus, for recreational seaport to be sustainable and be competitive in the face of risks, there is a need to manage these risks. Knowing how to identify risks, facet a value and a priority scale, design actions and device to minimise risks, and constantly monitoring them are essential to ensure recreational seaport survives and gives sustainable value. From a researcher viewpoint, it is interesting to use the SQS model in recreational seaport. It may provide the best strategic approach for recreational seaport at present and in the future to carve out a competitive edge.

This chapter recognises the importance of introducing the SQS model in any recreational seaport. Further, this research, which has reviewed existing research on seaport quality, has contributed to improving the understanding of what seaport quality is. The main finding of the definition of seaport quality, and from my viewpoint, is that it is a very broad subjective matter to define. However, from the findings of existing literature, its definition would be categorised into three categories: seaport effectiveness, seaport reliability and seaport governance. In addition, this chapter helps recreational seaport managers and users understand clearly about recreational seaport quality. In short, this chapter serves as a guideline for the recreational seaport community to improve the quality of all relevant elements to improve the performance of recreational seaport.

The attractiveness of recreational seaport is no longer based on strategic location but on the provision of efficient, prompt and quality services, excellent logistics and also land transport infrastructure and sea transport network. Recreational seaport has become commercial services and gateways. In fact, recreational seaports play a vital role in the domestic and international markets, if they can manage the services effectively and efficiently and be able to prevent unwanted consequences. Thus, constant evaluations need to be done by recreational seaport operators on its operations or processes, especially those related to providing marketing and selling of services to the end-users. It can be said that by improving the quality of the recreational seaport system and activities from any angle could improve the performance and competitiveness of this sector. Thus, to be sustainable and remain competitive in the face of risks, by adopting the SQS model can significantly reduce those risks and provide very good quality services and sustainable development of the recreational seaport industry.

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## **Conflict of interest**

The authors declare that there is no conflict of interest regarding the publication of this paper.

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## **Author details**

Mohamad Rosni Othman, Jagan Jeevan\*, Nurul Haqimin Salleh  
and Noor Azwa Noralam  
Faculty of Maritime Studies, University Malaysia Terengganu, Kuala Terengganu,  
Malaysia

\*Address all correspondence to: [jagan@umt.edu.my](mailto:jagan@umt.edu.my)

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