Defining Service Quality in Tramp Shipping: Conceptual Model and Empirical Evidence

Vinh V. THAI**, Wei Jun TAY***, Raymond TAN****, Alan LAI*****

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Abstract

Tramp shipping constitutes a prominent segment of the shipping market. As customers increasingly seek value from service providers for low price but yet high quality services, there is a pressing need to understand critically what construe the service quality for the tramp sector. In this respect, however, no prior research has been conducted for this market segment. This study recognises the gap in the existing maritime literature and aimed to propose and validate a service quality (SQ) model to address such a gap. The study employs a triangulation approach, utilising literature review, interviews and surveys to develop, refine and verify the SQ model proposed. Interviews were conducted with various parties in the tramp sector while a survey using a sample size of 343 tramp shippers and 254 tramp service providers was also conducted with tramp shippers and tramp service providers. It was revealed that the SQ model of six dimensions of Corporate Image, Customer Focus, Management, Outcomes, Personnel and Technical, and their 18 associated attributes could be used as a reliable tool to measure service quality in tramp shipping. This research contributes to fill the gap in the existing literature by introducing and
validating a new SQ model specifically for tramp shipping. Meanwhile, the model can also be used by practitioners to receive their customers’ evaluation of their service quality as well as a benchmarking tool for continuous improvement. This study is, however, confined to a small-sized data collected in Singapore and to the bulk commodity context. Further studies on the practicality of the SQ model involving larger sample size and in other regions and for the general and specialized cargoes would be required to enhance its reliability.

Key Words : Tramps Shipping, Service Quality, Exploratory Factor Analysis

I. Introduction

Shipping has always played a pivotal role in facilitating world trade with its ability to transport large volumes of cargoes at low costs. It connects major continents and links the manufacturers to their customers and suppliers. The tramp shipping sector is a massive market that is predominantly made up by the five major dry bulk trades (iron ore, grain, coal, phosphates and bauxite) and the tanker trade. In 2011, it was reported that the top five dry bulk commodities, together with crude oil and products accounts for about 61% (5.27 billion tons) of the world seaborne trade which stands at 8.7 billion tons. The strong demands for these commodities worldwide fuelled the supply of a large fleet of bulk carriers and tankers. Oil tankers and bulk carriers account for about 73.7% (1,130 million DWT) of the world fleet (1,534 million DWT) 1).

Competition has always been fierce within the tramp sector. It approximates to a perfect competition model with a large supply of vessels, low barriers of entry and the shipment of homogeneous commodities. Tramp shipping companies often adopt a cost leadership strategy to achieve competitive advantage. However, such an advantage can be quickly eroded in a dynamic and volatile industry such as shipping. Besides, customers are increasingly seeking value from service providers for low price but yet high quality services. For big tramp shippers such as oil majors and large mining corporations, for example, the decision to

1) UNCTAD(2012)
select a tram shipping company often goes beyond the cost consideration and extends to cover other aspects such as safety records, which is an attribute of quality in shipping. Therefore, an investigation of service quality research in this sector is warranted. However, the concept of service quality in the tramp sector has been largely elusive without prior research in this field. While numerous studies on service quality have been conducted for the maritime industry, they congregated mainly in the port or liner trade sector.

In this paper, we recognise the prominence of the tramp trade and its underlying competition, and aim to address the existing gap in the contemporary literature. This research seeks to propose a conceptual model of service quality for tramp shipping and validate it empirically with both tramp shippers and operators. The paper is thus structured as follows. First, the research background will be portrayed including literature review on the grounds of the conceptual model, including a review of service quality in the service and maritime industries. Research methodologies will be explained next covering sampling and data collection methods. The next section explains and discussed findings from this research, followed by academic and managerial implications. The paper concludes with a summary and suggestion for future research in this area.

II. Literature Review

1. Total Quality Management (TQM), Quality Awards and ISO Standards

Over the last two decades, TQM has been a notoriously imprecise term as there is little agreement on what TQM really means. Many different terms are used in the discussion of this topic, such as total quality control\(^2\), total quality improvement\(^3\), companywide quality control\(^4\) and strategic quality management\(^5\). However, a thorough review of the TQM literature suggests that TQM is generally based on the following three fundamental principles\(^5\): *Customer Orientation, Process Orientation, and Continuous*

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2) Feigenbaum(1956, 1991)
3) Lascelles and Dale(1991)
4) Ishikaw (1985)
5) Garvin(1988)
Tramp Shipping Service Quality: Conceptual Model and Empirical Evidence

In addition, TQM has been illustrated by various quality award models, such as the Malcolm Baldrige National Quality Award from the United States⁶, the Deming Prize from Japan⁷, the EFQM Excellence Award from Europe⁸ and the Australian Business Excellence Award⁹. An important objective of quality award providers is to recognize organisations that have done an outstanding job in implementing effective TQM programmes. There are nine major criteria covered by the four quality awards namely Leadership System, Impact on Society, Information and Analysis, Resources, Customer Management and Satisfaction, People Management, Process Management, Performance and Management of suppliers/partners, and Business Results. These criteria can be used as a foundation for deriving quality of tramp shipping factors. A summary of these criteria as well as the expected outcomes that can be seen from organisations is included in Table 1.

<Table 1> Nine major criteria of the quality awards and their expected outcomes for the organisation

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Description of Criterion</th>
<th>Expected Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leadership System</td>
<td>Examines how the organisation’s senior leaders’ personal actions guide and sustain the organisation.</td>
<td>-Strong management philosophy (benchmarking, continuous improvement, workforce safety) -High level of emergency readiness</td>
</tr>
<tr>
<td>Impact on Society</td>
<td>Examines how the organisation addresses its responsibilities to the public (social responsibility, community involvement and environmental conservation etc.)</td>
<td>-Development of an environmental policy to prevent pollution</td>
</tr>
<tr>
<td>Information and Analysis</td>
<td>Examines how the organisation selects, gathers, analyzes, manages, and improves its data, information and knowledge assets.</td>
<td>-Excellent data, information, and knowledge management (accurate, reliable, timely, accessible and secure)</td>
</tr>
<tr>
<td>Resources</td>
<td>Examines how the organisation manages various resources (assets, materials etc.).</td>
<td>-Well maintained equipment</td>
</tr>
<tr>
<td>Customer Management and Satisfaction</td>
<td>Examines how the organisation listens to the voice of its customers and uses this information to improve their relationship with the customers.</td>
<td>-Effective management of customer complaints -Well-managed relationships with customers</td>
</tr>
<tr>
<td>People Management</td>
<td>Examines how the organisation engages, manages and develops its workforce to utilize their full potential.</td>
<td>-Capable workforce</td>
</tr>
<tr>
<td>Performance &amp; Management of Suppliers/Partners</td>
<td>Examines how the organisation selects and manages its suppliers/partners to obtain the expected quality requirements.</td>
<td>-Inputs provided by suppliers are of high quality</td>
</tr>
<tr>
<td>Process Management</td>
<td>Examines how the organisation designs, manages, and improves its key processes to deliver customer value.</td>
<td>-Value creation for customers (on time delivery) -Consistent positive customer experience</td>
</tr>
<tr>
<td>Business Results</td>
<td>Examines the organisation’s performance (financial &amp; market results etc.).</td>
<td>-Strong financial performance -Major market player</td>
</tr>
</tbody>
</table>

Source: authors, compiled from various sources

Besides TQM and quality awards, the establishment of ISO standards has also been paramount towards achieving quality products and services. Numerous studies have shown that ISO 9001 standard is gaining popularity among organisations in a bid to improve their performance. The implementation of ISO 9001 has been found to improve customer satisfaction\(^{10}\), gain competitive advantages\(^{11}\) and improve product and service quality\(^{12}\). Similarly, a study done by Lloyds Register Quality Assurance\(^{13}\) found that ISO 9001 certified organisations experienced improvement in better service delivery, higher productivity and competitive advantage. The eight quality management principles of ISO 9001 are Customer Focus, Leadership, Involvement of People, Process Approach, System Approach to Management, Continuous Improvement, Factual Approach to Decision Making, and Mutually Beneficial Supplier Relationships. Though phrased differently from the criteria of quality awards, the essence of the quality management principles of ISO 9001 and the criteria of quality awards are largely similar. Thus, in combination with TQM and quality awards, ISO standards provide common foundations to derive service quality attributes for tramp shipping.

2. Quality in the Service Industry

To date, many studies have been dedicated to defining service quality in the service industry. Various scholars have suggested a number of dimensions of quality service. It was suggested that service quality comprises of three dimensions, namely the technical quality of the outcome of the service encounter, the functional quality of the process itself and the corporate image\(^{14}\). Following this, service quality was defined as a three-dimensional construct consisting of interactive, physical and corporate quality dimensions which are quite similar to Gronroos’s view\(^{15}\). A number of detailed classifications of service quality dimensions have also been suggested by other researchers, e.g. the work of Parasuraman, Zeithaml and Berry\(^{16}\) with their gap (PZB) model and

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10) Avery(1994)  
11) Vloeberghs and Bellens(1996)  
12) Idris, McEwan and Belavendram(1996)  
13) Lloyd Register Quality Assurance(1994)  
16) Parasuraman, Zeithaml and Berry(1985, 1988)
later developed into SERVQUAL (Service Quality). While the authors claimed that their five service quality dimensions are generic, it has been illustrated that this is not the case, and that the definition and number of service quality dimensions may vary depending on the context. It was concluded that service quality is probably a unidimensional construct depending on the types of service under study, and different measures designed for different service industries may prove to be a more viable and useful research strategy to pursue. While the SERVQUAL instrument has been accepted by many studies, there have been arguments that it only reflects the service delivery process. Research along this line was conducted by several other authors. It was also concluded that there are three new dimensions of quality beyond the two main factors of SERVQUAL.

Some other noteworthy studies were conducted and indicated three elements or three Ps of service quality, six criteria of good perceived service quality, five groups of characteristics that explain perceived quality in financial institutions, three dimensions which argued that service quality is not just customers’ perceptions but involved other perspectives such as internal management of processes, or in other words, not only focusing on the ‘technical outcome’ but also the ‘functional process’. Some authors proposed three dimensions, comprising the interaction quality, physical environment and outcome quality, while others developed a new scale consisting of four dimensions which are categorised in the technical and functional service quality proposed by Gronroos. Another approach in discussions is when the research is placed in the context of different socio-cultural and/or economic environments. Several authors raised concerns about whether SERVQUAL adequately captures the service quality dimensions in various socio-cultural and/or economic contexts. There have been some challenges to the validity of SERVQUAL. In addition, a recent study reviewed 30 applications of the SERVQUAL scale across different industries and concluded that the

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17) Babakus and Boller(1992)
19) Sureshchandar et al.(2002)
21) Brady and Cronin(2001)
22) Aldlaigan and Butt(2002)
25) Ladhari(2009)
SERVQUAL scale is largely useful for measuring service quality but it cannot be used in all circumstances. The practitioner should instead refine and adapt the scale to the specific context in order to measure service quality more accurately. Therefore, direct exportation of the dimensions to the maritime industry should be exercised with caution and catered towards the tramp shipping sector. It can be seen from the literature that there is no universal and encompassing approach to service quality dimensions which can be appropriate and applicable to all service industries and across all socio-cultural and economic environments. While the conceptualisation and measurement instrument of SERVQUAL was a basis for further research in various service industries, authors of this later research have also indicated that it is not an ideal model, applicable for all industries and in all socio-cultural and economic environments. Indeed, various authors have found that the dimensions of service quality indicated in SERVQUAL are either too many or too few for the specific context of their research.

Another aspect of service quality dimensions apparent from the literature review is that customer’s perception is no longer the only source of perceived service quality. Instead, management quality, or ensuring the quality of internal and external management processes of service production and delivery, is as important as satisfying customers by meeting and/or exceeding their requirements/expectations. Quality of service is perceived by not only focusing on its external elements such as satisfying traditional customers but also by concentrating on internal factors within organisations. In addition, with the paradigm shift of the concept of traditional customer to stakeholder nowadays, social responsibility is perceived as a critical dimension which can enhance or damage the image or reputation of organisations and hence the perceived quality of their services.

In summary, it can be seen that the claim about the universality of SERVQUAL as a tool of measuring service quality is debatable and different business sectors will likely need a tailor-made measurement tool to fit in their specific context. Hence, in order to design and test a tool to measure service quality for tramp shipping, a critical review of common dimensions and factors which are used to measure quality in the service industry is desired. Such a review has suggested that dimensions such as corporate image, responsiveness, assurance, reliability, tangible and
internal organization could be used as a base to develop further attributes to measure service quality which are specific to tramp shipping. The following section further examines these dimensions in the context of maritime transport.

3. Service Quality in the Maritime Industry

While service quality in the maritime context has been researched\(^{26}\), these studies to a large extent tend to congregate in the port or liner trade sector. The concept of service quality in the tramp sector has been elusive without prior research in this field. Perhaps, one of the most comprehensive research in this respect is the recent study\(^{27}\) which attempted to review comprehensively all earlier relevant literature and proposed and validated a service quality model, ROPMIS, to define service quality for the entire maritime industry. The model comprises of six dimensions, namely, Resources, Outcomes, Processes, Management, Image/reputation and Social Responsibility and 24 associated factors. However, it was acknowledged in the paper that it is just ‘the first stage of a more comprehensive study’, and the model to some extent is generic and not specific to any particular sector of the maritime industry.

Tramp shipping is the transportation by sea of low-value high-volume shipments in full shipload but transport demand is irregular and not frequent in the long run. The ship is therefore operated like a taxi, unlike liner shipping in which the ship’s schedule and ports of calls are fixed and cargo is of high value but low volume. Therefore, service quality of tramp shipping would not contain all important indicators of liner shipping. The tramp sector follows a systems model which includes the three stages vital to a tramp shipping company: Input, Service Processes, and Output\(^{28}\). In order to understand service quality within the tramp shipping sector, individual sub-sectors within tramp shipping should be examined. This would allow us to look out for peculiar characteristics within each sub-sector that requires a particular aspect to be covered in the proposed model of service quality for tramp shipping. In this respect, an understanding of the world tramp fleet would help to identify essential

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\(^{26}\) Murphy, Dalenberg and Daley(1989, 1991, 1992); Lopez and Poole(1998); Ughoma et al.(2004)

\(^{27}\) Thai(2008)

\(^{28}\) Lagoudis, Lalwani and Naim(2004)
characteristics of each sub-sector, thus contributing to the identification of important service quality factors pertinent to the tramp shipping sector.

A large part of the tramp sector is made up of tankers, or liquid bulk carriers. In fact, nearly 40% of the world fleet (in terms of DWT) is made up of various types of tankers in 2011. There are various types of tankers which are designed to carry different kinds of cargoes ranging from crude oil to refined hydrocarbon products to liquefied natural gas and even fresh water. It should be noted that LNG tankers are generally not part of the tramp sector as they are almost always built to serve a specific LNG plant and do not find themselves on the tramp market looking for employment. Meanwhile, dry bulk vessels also make up another huge portion of the tramp sector (35.8% of the total world’s fleet in 2011). They tend to be unsophisticated, low value vessels which tend to carry low value cargoes. Because of the relative laxness in their management, they tend to have a poor safety record and are often considered to be most risky in terms of damage to the environment as well as accidents.

Some factors have been identified as being important factors within the tramp shipping industry. Concerns of pollution by tankers are paramount in the tanker industry, with many studies focusing on the pollution caused by tankers and their trade, especially in the oil trade. This is due to the sheer amount of oil carried within the tanks, up to millions of barrels of oil in the largest tankers. The costs of clean up can be astronomical, going into billions of dollars. The costs of oil spills from tankers in relation to the weight of spilled oil was studied and the cost of averting a ton of oil spilt and the cost of cleanup was found to vary with the type of fuel and the quantity spilt. Critics of oil tankers argue that the quality of ships built is decreasing. That coupled with the sheer amount of oil transported a year makes it a disaster waiting to happen. Not only is there environmental damage when oil is spilt, during regular operations such as sailing or even transfer of liquid cargo, Volatile Organic Compounds (VOC) are released into the atmosphere. This is on top of the carbon emissions that are regularly produced by all shipping activities.

Companies’ concerns about environmental and regulations compliance

29) UNCTAD(2010)
30) Bateman, Ho and Mathai(2007)
31) Yamada(2009)
33) Martens, Oldervik, Neeraas and Strom(2001)
can be understandable. A recent example as seen in the Deepwater Horizon oil spill, BP’s catastrophic oil spill in the Gulf of Mexico, illustrates that failure to adhere to environmental protection and safety, under Corporate Social Responsibility, can impact the organization adversely. The incident has tarnished BP’s reputation. Aftermath of the incident results in a plummet of its market value by one third and subsequently, liabilities of $30 billion to $60 billion from fines, clean-up costs and litigation. In an attempt to account to their stakeholders and shore up the public’s declining confidence in them, BP has dedicated a webpage which provides updates on the company’s response to the accident.

Other oil spill incidents such as the Exxon Valdez, the Torrey Canyon and the Prestige serves as a reminder of the costly and devastating impact of an oil spill on the environment and the ecosystem. As ships often carry dangerous and corrosive cargoes such as crude oil and chemicals, shipping companies therefore need to place a strong emphasis on safety and crisis management ability which might otherwise leads huge liabilities incurred by the company. Given that the environment is a huge concern and high in popular consciousness, it would be reasonable to assume most companies factor it into account as a quality factor to ensure that their corporate image is not affected. This seems to be in opposition with the trend in bulk shipping which tends to be much more lax about the safety issue.

Another area of quality in the maritime industry is quality of crew, which is of utmost importance in shipping. It is argued that most maritime accidents are caused by human error, and the human aspect of shipping boils down to four factors: Competency, Organization, Communication and Design. These factors are highly relevant and bring the essence of crewing across very well. It is also discussed in the literature that certain negative aspects of seafaring can be minimized by policies such as shorter voyages, continuous employment as opposed to voyage employment and opportunities for family to accompany crew on voyages. Manpower is not always a major consideration in other models of service quality. However, shipping is intricately linked with the physical assets and the crew that man these assets. Crewing is thus a unique aspect of quality in the shipping industry that definitely should not be overlooked.

34) McCollam(2010)
35) BP(2010)
Safety of the maritime assets as well as of the crew is of utmost importance to all parties involved. For instance, precursors to accidents in tankers have a comprehensive list of factors for safety\(^{37}\), which include, Hiring Quality People, Safety Orientation, Formal Learning System, Promotion of Safety, Prioritization of Safety, Communication, Problem Identification, Shipboard Feedback, Shipboard Responsibility, Empowerment, Anonymous Reporting and Individual Feedback. These factors can be condensed into the standard of the company’s Qualitative Safety Culture and the Quantitative Safety Performance. Safety aboard ships is especially important with the potential for a domino chain of events snowballing, causing a maritime catastrophe.

In addition, a unique aspect of the tanker trade is the requirement of oil majors for vetting, or an extra stringent process checks with the objective of increasing safety at sea and decreasing pollution. Vetting is conducted to fulfill the aims of ensuring international legislation compliance, avoiding major oil pollution cases, increasing safety awareness and management aboard, decreasing danger of explosion or fire, and ensuring that cargo is not carried on substandard ships\(^{38}\). It is thus important that this practice is factored in as a service quality factor for tramp shipping, specifically for the tanker sub-sector.

III. Methodology

1. Developing the Conceptual Model

Table 2 serves as a framework for the development of the conceptual model of service quality (SQ) in tramp shipping, synthesized from various relevant literature. The table contains a list of dimensions and attributes that are applicable to the tramp shipping sector. These dimensions and attributes were extracted from the quality management principles as well as the comprehensive review of service quality and quality in transport in the literature and organised in six primary dimensions: Corporate Image, Customer Focus, Leadership, Outcomes, Personnel and Technical. Given that tramp shipping is by nature a service sector and a sub-sector of

\(^{37}\) Grabowski, Ayyalasomayajula, Merrick and McCafferty(2007)
\(^{38}\) Soundtanker(2007)
maritime transport, the dimensions and attributes derived from the above mentioned review are considered significant and relevant to measure service quality of tramp shipping. From this framework, a critical review and reasoning was conducted to extract those attributes which are deemed most appropriate for tramp shipping, and a conceptual SQ model, comprising of 36 SQ attributes within 6 primary SQ dimensions, was eventually proposed.

In addition to the literature review, in-depth interviews were conducted to gain further insights to the proposed model of service quality in tramp shipping. A total of five interviews were conducted with key parties in the tramp sector, including a dry bulk charterer, a liquid bulk charterer, a liquid bulk commercial ship manager, a liquid bulk broker, and a dry bulk shipper to reflect the view from both service provider and shippers toward the issue of service quality in tramp shipping. The interview findings prompted changes to be made to the proposed conceptual SQ model. In summary, for the revised SQ model, the six primary SQ dimensions remain the same but some SQ attributes have been changed to provide easier understanding and better reflection of the maritime context. In addition, some attributes were removed due to inappropriateness and others added to reflect the contemporary practices in the tramp shipping sector. The revised SQ model consisting of six dimensions and 27 explaining attributes is summarized in Table 3 after the interview stage.
<table>
<thead>
<tr>
<th>Dimension</th>
<th>Definition</th>
<th>Attributes (Literature Review)</th>
</tr>
</thead>
</table>
| Corporate Image | Relates to the overall perception of the shipper about the tramp service provider which includes credibility, reputation, financial, marketplace performance, actions taken to ensure the sustainability of the environmental and company’s emphasis on health, safety and security. | 9 major criteria of quality awards  
- Business Results  
- Impact on Society  
- ISO 4001  
- Environmental Management System | Service industry  
- Corporate Image  
Maritime industry  
- Environmental Footprint  
- Image  
- Social Responsibility |
| Customer Focus | Relates to how the tramp service provider engage the shipper to provide a customer driven excellence experience, for example, well-managed relationship with shippers, management of customers’ complaints/problems, accessibility of service, responsiveness, comprehensiveness of services and providing complete, correct and timely information. | TOM  
- Customer Orientation  
9 major criteria of quality awards  
- Customer Management and Satisfaction  
- Information and Analysis (providing accurate information) | ISO 9001  
- Total Quality Management  
- Decision Making (providing accurate information)  
Service industry  
- Assurance  
- Empathy  
- Responsiveness  
Maritime industry  
- Processes |
| Leadership     | Relates to the implementation and enforcement of policies by the senior leaders, for example, continuous improvement and safety culture. This dimension also relates to the crisis management ability of the leaders. | TOM  
- Continuous Improvement  
ISO 9001  
- System Approach to Management | Service industry  
- Management Philosophy  
Maritime industry  
- Crisis Management  
- Management  
- Qualitative Safety Culture |
| Outcomes       | Relates to the services being received by the shippers, for instance, on time delivery of the cargoes, pricing of service, loss or damage of cargoes, and consistency of service. | 9 major criteria of quality awards  
- Process Management  
Service industry  
- Outcome  
- Reliability | Maritime industry  
- Outcome  
- Pricing  
- Quantitative Safety  
- Performance |
| Personnel      | Relates to the competences of both the shore based and ocean going staffs.                                                                                                                                 | 9 major criteria of quality awards  
- People Management  
ISO 9001  
- Involvement of People | Service industry  
- Internal organization  
Maritime industry  
- Experience, Certification & Composition of Crew  
- Crew contracts  
- Resources |
| Technical      | Relates to the hardware provided for the transportation service such as safety records, vetting records, conditions, designs, capacities and maintenance of vessel. | TOM  
- Process Orientation  
9 major criteria of quality awards  
- Resources  
ISO 9001  
- Process Approach | Service industry  
- Tangible (Hardware provided)  
Maritime industry  
- Compliance with regulations  
- Quality of ships  
- Resources  
- Vetting |
2. Data Collection, Sampling, and Design and Administration of Research Instruments

The triangulation approach utilising both in-depth interviews and survey was employed to collect primary data for this research. During the comprehensive literature review, important SQ attributes were derived to construct the SQ model for the tramp sector. In-depth interviews were then conducted to gain further insights into the derived SQ attributes. Thereafter, the SQ model was revised following the outcomes of the interviews and then tested empirically through a survey with both service providers and shippers in the tramp sector.

<Table 3> Revised conceptual model of SQ in tramp shipping

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>SQ Code</th>
<th>Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporate Image</td>
<td>SQ1</td>
<td>Good reputation (positive track record on safety &amp; fulfillment of contract obligation)</td>
</tr>
<tr>
<td></td>
<td>SQ2</td>
<td>Strong financial position</td>
</tr>
<tr>
<td></td>
<td>SQ3</td>
<td>Major market player</td>
</tr>
<tr>
<td></td>
<td>SQ4</td>
<td>Green shipping (minimal pollution)</td>
</tr>
<tr>
<td>Customer Focus</td>
<td>SQ5</td>
<td>Courteous, friendly and helpful frontline staff</td>
</tr>
<tr>
<td></td>
<td>SQ6</td>
<td>Prompt management of customers’ complaints/problems</td>
</tr>
<tr>
<td></td>
<td>SQ7</td>
<td>Well-managed relationship with shipper</td>
</tr>
<tr>
<td></td>
<td>SQ8</td>
<td>Information and documents provided are complete, timely and correct (e.g., submission of NOR, calculation of demurrage charges)</td>
</tr>
<tr>
<td></td>
<td>SQ9</td>
<td>Accessible service (local offices in the operating regions, 24/7 customer support)</td>
</tr>
<tr>
<td></td>
<td>SQ10</td>
<td>Discreet handling of customers’ information</td>
</tr>
<tr>
<td>Leadership</td>
<td>SQ11</td>
<td>Good crisis management ability</td>
</tr>
<tr>
<td></td>
<td>SQ12</td>
<td>Good management philosophy (decisive, continuous improvement, safety culture &amp; whistle blowing policy)</td>
</tr>
<tr>
<td>Outcomes</td>
<td>SQ13</td>
<td>Competitive pricing (freight rate/charter hire)</td>
</tr>
<tr>
<td></td>
<td>SQ14</td>
<td>Reasonable terms and conditions in freight contract/charter party (e.g., provision of escape clause for shipper to cancel the contract if the vessel is not ready for loading)</td>
</tr>
<tr>
<td></td>
<td>SQ15</td>
<td>Punctual delivery of the vessel and cargoes</td>
</tr>
<tr>
<td></td>
<td>SQ16</td>
<td>Minimal discrepancies between cargo loaded and discharged in terms of quality and quantity</td>
</tr>
<tr>
<td></td>
<td>SQ17</td>
<td>Consistent service</td>
</tr>
<tr>
<td>Personnel</td>
<td>SQ18</td>
<td>Qualified crew (STCW certified &amp; possession of relevant certifications for working onboard different vessel classes)</td>
</tr>
<tr>
<td></td>
<td>SQ19</td>
<td>English speaking crew</td>
</tr>
<tr>
<td></td>
<td>SQ20</td>
<td>Experienced crew</td>
</tr>
<tr>
<td></td>
<td>SQ21</td>
<td>Competent shore-based staff (vast knowledge in shipping operations)</td>
</tr>
<tr>
<td>Technical</td>
<td>SQ22</td>
<td>Compliance of international regulations which would otherwise lead to vessel arrest (IMO, Port State Control and Classification Society standards)</td>
</tr>
<tr>
<td></td>
<td>SQ23</td>
<td>Positive vetting record (SIRE and CDI inspections)</td>
</tr>
<tr>
<td></td>
<td>SQ24</td>
<td>Vessel’s flag (government regulatory &amp; financial advantages for shippers)</td>
</tr>
<tr>
<td></td>
<td>SQ25</td>
<td>Vessel’s cargo carrying capacity</td>
</tr>
<tr>
<td></td>
<td>SQ26</td>
<td>Vessel’s age and maintenance (efficient fuel consumption, seaworthy, cargo worthy)</td>
</tr>
<tr>
<td></td>
<td>SQ27</td>
<td>Vessel’s specifications (ability to meet ports’ depth &amp; air draft restrictions)</td>
</tr>
</tbody>
</table>
A total of five interviewees representing key parties in the tramp sector were selected for the interview, including a dry bulk charterer, a liquid bulk charterer, a liquid bulk commercial ship manager, a liquid bulk broker, and a dry bulk shipper whom contacts were extracted from the Singapore Maritime Foundation’s member directory. Professionals holding managerial positions were invited to share their perception and experience on existing industry practices of service quality. In addition, they were requested to comment on the importance and suitability of SQ attributes in the proposed model.

In addition, in order to validate the revised SQ model as a result of the interviews, a survey with tramp service providers and shippers was also conducted. The sampling frame of tramp service providers was obtained from the Singapore Shipping Association (SSA) and the Singapore Maritime Directory, including 254 shipowners and commercial ship managers operating wet bulk and dry bulk vessels. Since it was a relatively small number, the entire population was targeted for the survey. For the tramp shipper population, a combined number of 686 firms were obtained from the directory of the Singapore Chinese Chamber of Commerce and Industry (SCCCI), Singapore Indian Chamber of Commerce and Industry (SICCI) and the Times Business Directory of Singapore. Based on the population size available, the sample size targeted was 343 (50%). These firms were selected at random from the three directories. The industry sectors where these companies were based include building materials, chemicals, cement, coal, importers/exporters, oil companies, edible oil, industrial oil, oil refinery, petroleum products, petrochemicals, rubber and steel. In total, a combined sample size of 597 firms, including both tramp service providers and shippers, was selected for the survey.

The survey questionnaire contained two sections. In the first section, a copy of the revised SQ model was included and the respondents were asked to rate the importance of each SQ attributes on a 5-point scale, with 1 as “very important” and 5 as “not at all important” being two extreme points of the scale. Respondents were also asked to provide explanations for those SQ attributes that were rated as either ‘unimportant’ or ‘not at all important’. In addition, respondents were encouraged to include other SQ attributes that are deemed important to be included in the SQ model. The second section of the questionnaire comprises of a series of demographic questions to filter and classify the respondents for data analysis purposes.
The participants of the survey were contacted through local postage mails. Within each mail, a survey cover letter, a set of survey questionnaire and a return envelope was attached. They were given the option to return the questionnaire via email or via the return envelope provided. Alternatively, they could also complete the online version of the survey through a webpage created for this research. In order to increase the response rate, a follow-up letter was sent two weeks after the initial mail-out. By the cut-off date, a total of 74 questionnaires were completed and returned, of which 38 responses came from tramp service providers. On the other hand, there were 36 responses from tramp shippers. Overall, the response rate for tramp shippers and service providers are 10.5% and 15.0% respectively.

IV. Analysis and Findings

1. Factor Analysis of the Proposed Model

To examine the structure of the proposed model of SQ in tramp shipping, factor analysis was conducted to reduce the number of measurement items to a smaller more manageable set. The initial run of factor analysis on the 27 measurement items of service quality for tramp shipping revealed that the strength of inter-correlations, which is assessed by Bartlett’s test of sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was good. The KMO index is 0.790, greater than the normally suggested minimum value of 0.60, and Bartlett’s test of sphericity is significant ($p = 0.000$), indicating the suitability of a factor analysis. The factor analysis adopts the Principal Component Analysis (PCA) technique and applies the Varimax with Kaiser Normalisation approach. The factor analysis of 27 measurement items found seven components with eigenvalues above 1, explaining 69.679% of the variance. This result implies further analysis since a decision had to be made on the number of factors to be retained and the number of factors from the analysis is greater than the initial dimensions in the proposed model.

A commonly accepted standard for decision making is that an item is loaded highly on one factor (i.e. more than 0.5) and lowly on all other factors. In addition, for the first run of factor analysis, it is quite common
that some ‘disturbing’ items do not load highly on any identified factor. The then usual procedure is to drop those items, one by one, and run the factor analysis again until all items are loaded highly on some specific factors, provided that the deletion of a particular item does not conceptually affect the dimension that the item is initially associated with. The same procedure is applied when an item is found to be loaded equally high on several factors. The first run of factor analysis revealed that one item (SQ21 – _competent shore based staff_) did not load highly on any factor and had the lowest communality. This item was initially parked under the Personnel dimension which is mainly about the crew. Since this item is about the shore based staff, it is argued, however, that it can be conceptually embedded in the SQ5, SQ6 and SQ7 in the original model. After careful examination, it was decided that this item is dropped from the existing measurement scale.

The remaining 26 items were then used in the subsequent round of factor analysis using the same procedure and judgment. The result of this analysis showed that the values of Bartlett’s test of sphericity and KMO measure of sampling adequacy still met the expected standard while the rotated component matrix indicated that SQ4 (_green shipping_) was loaded equally on two among the seven identified factors. It was then decided to drop this item after careful consideration as the deletion of this item does not affect the conceptual meaning of the intended dimension. Similarly, subsequent rounds of factor analysis were conducted to identify the best model in which an individual item is clearly loaded on a particular factor, and all items within a factor are loaded highly (i.e. more than 0.5) on that factor while at the same time contribute to define the factor conceptually. During this process, several items namely SQ1, SQ10, SQ22, SQ14, SQ24 and SQ9 were dropped using the same procedure and judgment as explained earlier. The last round of factor analysis revealed five factors with the values of Bartlett’s test of sphericity and KMO measure of sampling adequacy being 0.78 and 0.000 respectively. The five factors aggregately explain 70.091% of variance, in which factor 1 explains 33.705% of variance, 14.561% from factor 2, 8.156% from factor 3, 7.640% from factor 4, and 6.029% from factor 5 respectively. The results are summarized in Table 4.

Table 4 also presents the component rotated matrix generated from the last run of factor analysis. It can be seen from this table that all items
within a factor are loaded highly on that factor and there is no case where an item is loaded equally on several factors. Within each factor extracted, all items have a very strong loading (i.e. more than 0.5) and there is no item which was not loaded highly on any factor. Factor 1 consists of six items namely SQ5 (Courteous, friendly and helpful frontline staffs), SQ6 (Prompt management of customers’ complaints/problems), SQ7 (Well-managed relationship with shipper), SQ13 (Competitive pricing (freight rate/charter hire)), SQ15 (Punctual delivery of the vessel and cargoes) and SQ16 (Minimal discrepancies between cargo loaded and discharged in terms of quality and quantity). The first three items belong to the Customer Focus while the latter three are with the Outcomes dimension in the original conceptual model. Although these items are highly loaded on a factor, it is conceptually more meaningful to split them into two factors, since the first three items are more related to how employees of the tramp company serve their customers while the latter three mainly deal with the outcomes of their service performance. The first three items are thus retained in the Customer Focus while the latter three are kept in the Outcomes dimension.

Factor 2 consists of four items, SQ18 (Qualified crew (STCW certified & possession of relevant certifications for working onboard different vessel classes)), SQ19 (English speaking crew), SQ20 (Experienced crew) and SQ23 (Positive vetting record (SIRE and CDI inspections). Among these, SQ23 has the weakest factor loading (0.647) on the factor while the others have more or less the same factor loading (all above 0.80). In the original conceptual model, the first three items are all related to the Personnel (crew onboard the vessel) while the fourth (SQ23) belongs to the Technical dimension (the vessel). It can be however argued that a vessel’s technical profile in terms of vetting record also depends to a large extent on her crew’s competency in implementing relevant maintenance exercises. Therefore, it is meaningful to keep SQ23 within the Personnel factor.
There are four items loaded highly on Factor 3, namely, SQ8 (Information and documents provided are complete, timely and correct), SQ11 (Good crisis management ability), SQ12 (Good management philosophy) and SQ17 (Consistent service). Among these, SQ17 has the weakest factor loading (0.584). It is noted that SQ8 was originally with the Customer Focus, SQ11 and SQ12 with the Leadership, and SQ17 with the Outcomes dimension. The examination of the conceptual meaning of these items indicates that they all focus on the management capability of the tramp operator to provide a consistent service, complete, timely and correct information and documents, as well as possessing good management philosophy and crisis management ability. It is therefore
suggested that a new dimension named Management is created to house these items. In addition, SQ8 is renamed as ‘providing complete, timely and correct information and documents’ and SQ17 as ‘providing consistent service’ to better reflect the meaning of the new dimension. Factor 4 houses three items of SQ25 (Vessel’s cargo carrying capacity), SQ26 (Vessel’s age and maintenance) and SQ27 (Vessel’s specifications) which are highly loaded (factor loadings of 0.793, 0.718 and 0.857 respectively) on one factor. As these three items of Factor 4 are all related to the vessel, the Technical dimension in the original conceptual model will be retained. Meanwhile, Factor 5 consists of two items of SQ2 (Strong financial position) and SQ3 (Major market player) which are highly loaded (0.808 and 0.772 respectively). Together they help to define the conceptual meaning of the Corporate Image dimension in the original conceptual model.

In summary, although the factor analysis suggests five factors statistically, it is decided that a six-factor scale would be more meaningful to measure service quality of tramp shipping. The next step in the process is to check the internal consistency of the above groupings under each of the factors to verify whether they are reliable. For this purpose, the scale reliability test was conducted to identify alpha coefficient for each factor and specifically examine whether alpha is negatively affected by the deletion of some items. The results of the reliability analysis of the six factors are provided in Table 5. The alpha coefficients of the six factors are 0.764, 0.667, 0.862, 0.821, 0.831 and 0.724 respectively. A closer examination of alpha values for each item in each factor revealed that for Factors 1, 3, 4, 5 and 6 there is no item which affects negatively the overall alpha values. However, for Factor 2, the factor alpha (0.667) would have been increased to 0.708 if SQ13 (Competitive Pricing) is deleted from the scale whilst such an effect would not occur if any of the remaining items (SQ15 and SQ16) is deleted. In fact, while competitive pricing (SQ13) could be considered as part of the service outcomes, it is often debated in the literature (as well as in management practice) whether this item should be treated separately from service quality or should be part of it. As the deletion of this item does not conceptually change the meaning of the factor, it is decided to drop this item from the scale.

All in all, the factor analysis and reliability test suggest that service quality for tramp shipping can be measured by a scale of 18 items.
concentrated in six factors of Customer Focus, Outcomes, Personnel, Management, Technical, and Corporate Image.

2. Perceived Importance of the Extracted SQ Dimensions and Attributes

To have a better understanding of respondents’ perception of the validated six tramp shipping service quality factors, a descriptive analysis was performed at the factor level. Table 6 provides a summary of this analysis. It can be seen from this table that outcomes is the tramp shipping service quality factor that was perceived most important by respondents, followed by management, customer focus, personnel, and technical factors, while corporate image is the least perceived quality factor (although this factor’s mean score also indicates that it is seen as an important aspect to evaluate the service quality of a tramp shipping company). This finding is in line with the general understanding in the literature that outcomes of the service performance are normally most concerned by both service providers and customers, and therefore any activity performed focusing on the internal management as well as the needs and requirements of customers and associated care and attention from the company’s employees in performing these activities would be appreciated by customers. It can be equally argued that all other technical activities relating to the preparation for the readiness and seaworthiness of the vessel are to concentrate on the needs and requirements of customers and, therefore, the quality of those activities would also affect customers’ perception of the quality of tramp shipping service rendered to them.
### Table 5: Scale reliability of extracted tramp shipping SQ factors

<table>
<thead>
<tr>
<th>Items</th>
<th>Scale Mean if Item Deleted</th>
<th>Scale Variance if Item Deleted</th>
<th>Corrected Item-Total Correlation</th>
<th>Cronbach's Alpha if Item Deleted</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQ5</td>
<td>3.2703</td>
<td>1.323</td>
<td>.617</td>
<td>.663</td>
</tr>
<tr>
<td>SQ6</td>
<td>3.5946</td>
<td>1.422</td>
<td>.649</td>
<td>.623</td>
</tr>
<tr>
<td>SQ7</td>
<td>3.3784</td>
<td>1.663</td>
<td>.532</td>
<td>.751</td>
</tr>
<tr>
<td>SQ13</td>
<td>2.7027</td>
<td>.842</td>
<td>.392</td>
<td>.708</td>
</tr>
<tr>
<td>SQ15</td>
<td>2.8378</td>
<td>.965</td>
<td>.544</td>
<td>.498</td>
</tr>
<tr>
<td>SQ16</td>
<td>2.8108</td>
<td>.868</td>
<td>.522</td>
<td>.516</td>
</tr>
<tr>
<td>SQ18</td>
<td>5.6892</td>
<td>2.765</td>
<td>.771</td>
<td>.799</td>
</tr>
<tr>
<td>SQ19</td>
<td>5.2027</td>
<td>3.315</td>
<td>.621</td>
<td>.859</td>
</tr>
<tr>
<td>SQ20</td>
<td>5.5405</td>
<td>2.827</td>
<td>.849</td>
<td>.763</td>
</tr>
<tr>
<td>SQ23</td>
<td>5.8649</td>
<td>3.543</td>
<td>.616</td>
<td>.860</td>
</tr>
<tr>
<td>SQ8</td>
<td>4.7432</td>
<td>3.235</td>
<td>.605</td>
<td>.791</td>
</tr>
<tr>
<td>SQ11</td>
<td>4.7027</td>
<td>2.951</td>
<td>.662</td>
<td>.765</td>
</tr>
<tr>
<td>SQ12</td>
<td>4.4865</td>
<td>2.774</td>
<td>.697</td>
<td>.749</td>
</tr>
<tr>
<td>SQ17</td>
<td>4.7162</td>
<td>3.275</td>
<td>.615</td>
<td>.788</td>
</tr>
<tr>
<td>SQ25</td>
<td>3.5811</td>
<td>1.589</td>
<td>.745</td>
<td>.716</td>
</tr>
<tr>
<td>SQ26</td>
<td>3.9189</td>
<td>2.103</td>
<td>.676</td>
<td>.786</td>
</tr>
<tr>
<td>SQ27</td>
<td>3.9524</td>
<td>1.954</td>
<td>.670</td>
<td>.788</td>
</tr>
<tr>
<td>SQ2</td>
<td>2.3108</td>
<td>.573</td>
<td>.580</td>
<td>.615</td>
</tr>
<tr>
<td>SQ3</td>
<td>1.7162</td>
<td>.370</td>
<td>.580</td>
<td>.623</td>
</tr>
</tbody>
</table>

### Table 6: Perception of tramp shipping SQ factors

<table>
<thead>
<tr>
<th>Factors</th>
<th>Items</th>
<th>M</th>
<th>STD</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer focus</td>
<td>Courteous, friendly and helpful frontline staffs</td>
<td>1.707</td>
<td>0.573</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Prompt management of customers' complaints/problems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Well-managed relationship with shipper</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outcomes</td>
<td>Punctual delivery of the vessel and cargoes</td>
<td>1.351</td>
<td>0.459</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Minimal discrepancies between cargo loaded and discharged in terms of quality and quantity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personnel</td>
<td>Qualified crew (STCW certified &amp; possession of relevant certifications for working onboard different vessel classes)</td>
<td>1.858</td>
<td>0.575</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>English speaking crew</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experienced crew</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Positive voting record (SIRE and CDI inspections)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td>Providing complete, timely and correct information and documents</td>
<td>1.554</td>
<td>0.566</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Good crisis management ability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Good management philosophy (decisive, continuous improvement, safety culture &amp; whistle blowing policy)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Providing consistent service</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical</td>
<td>Vessel’s cargo carrying capacity</td>
<td>1.905</td>
<td>0.659</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Vessel’s age and maintenance (efficient fuel consumption, seaworthy, cargo worthy)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vessel’s specifications (ability to meet ports’ depth &amp; air draft restrictions)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corporate image</td>
<td>Strong financial position</td>
<td>2.014</td>
<td>0.608</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Major market player</td>
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<td></td>
</tr>
</tbody>
</table>
V. Academic and Managerial Implications

This study’s contribution to the academic field is multi-fold. First, this study contributes to leverage the existing gap in the contemporary literature in which research in the field of quality management in the maritime industry in general and tramp shipping in particular is scant. Secondly, this study conceptualized and validated a new service quality model specifically for the tramp shipping sector, and this supports many other scholars’ belief that the SERVQUAL model, although popularly used in various contexts, cannot be a one-size-fit-all model to all sectors and situations. The SQ model in this study contributes to enhance the understanding of service quality, as it is evidenced from the model’s dimensions and attributes that the emphasis of service quality should not only be on the ‘external outcome’ that customer concerns, but also the ‘internal management’ of the service provider. These together construe the all-rounded SQ model and re-assure the belief that the quality of shipping in general should include not only quality of the service, but also those of ship and crew. Besides, this study enriches and contributes to the current general literature on service quality and also serves as a preliminary framework for future studies to be engaged in the important sector of tramp shipping and beyond. Hence, it is believed that this study would contribute to enhance the understanding of how service quality is measured in tramp shipping and how tramp ship operators can improve on their service quality.

Beside academic contributions, it is envisaged that this study makes several important contributions to the tramp shipping industry. For the tramp service providers, the model from this research can act as a measurement tool to benchmark their performance in relation to the industry. Tramp service providers can act on the findings to realign their priorities in order to improve customer satisfaction and resource allocation. In addition, the SQ model could serve as a management tool for managers to identify areas of weaknesses and devise improvement plans to overcome them. This would help boost the company’s competitiveness. Last but not least, the SQ model could help establish common standards for service quality which the users can identify with. This will vastly improve communication and relationships between service providers and customers.
VI. Conclusion

Following the gaps identified in the existing literature, this study employs a triangulation approach, utilising literature review, interviews and surveys to conceptualise and validate a model of service quality in the tramp shipping sector. A SQ model comprising of 27 SQ attributes categorised under six primary SQ dimensions of Corporate Image, Customer Focus, Leadership, Outcomes, Personnel and Technical was initially proposed. The model was then empirically validated through interviews and surveys with both tramp shippers and tramp service providers. Through the process of factor analysis including the reliability test of the measurement scale, the number of attributes in the model was reduced to 18 items with the Leadership dimension changed to Management and Outcomes factor was perceived as the most important quality aspect in tramp shipping. The analysis results showed that the model can be used as a reliable tool to measure service quality in tramp shipping.

Despite of several academic and managerial contributions, this study faces the limitation of the small sample size and the research confined within Singapore context, and thus further generalization beyond this region must be interpreted with caution. Furthermore, the study focused only on the dry bulk and liquid bulk sectors and the SQ model has not been validated for other sectors such as general cargoes and project cargoes. Hence, future studies can be replicated in the other regions and sectors and engage a larger sample size to enhance the validity and reliability of the proposed model. Several directions in the future research agenda include (1) to use the measurement tool developed in this study to investigate the perception gaps of service quality between tramp operators and their customers, (2) to explore how the perception of service quality would affect customers’ choice of tramp operators, (3) to examine how service quality affects tramp ship operators’ performance, including profitability, and (4) how tramp ship operators perform in terms of service quality across countries. Nevertheless, this research is of practical value to practitioners who are to assure quality of their tramp service and contributes to enrich the contemporary knowledge of quality management in general and those in shipping at large.*

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