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Service quality in maritime transport: conceptual model and empirical evidence

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Abstract

Purpose – The purpose of this paper is to extend knowledge on service quality and how it is defined and thus, managed, in the context of maritime transport by proposing and testing a new conceptual model of service quality.

Design/methodology/approach – The study used a sample of 197 shipping companies, port operators and freight forwarders/logistics service providers, employing the triangulation of both mail survey and in-depth interview techniques. A total of 120 usable questionnaires were returned and 25 interviews conducted. Data were analysed using the SPSS 13.0 software and thematic analysis technique.

Findings – It was found that service quality in maritime transport is a six-dimensional construct consisting of resources, outcomes, process, management, image, and social responsibility (ROPMIS), with each dimension measured by a number of explaining factors making up a total of 24 factors. Findings also revealed that factors involving the outcomes and process of service provision, as well as the management factors, which all focus on satisfying the customers, received high ranking. They also emphasised process and management-related factors which involve the centre of all quality systems: the human element.

Research limitations/implications – As this is the first stage of a more comprehensive study, the model was tested only with service providers, and this is the major limitation. Future research direction is desired, e.g. conducting the study using the same instruments on customers and compare the gaps with this research.

Originality/value – The major contribution of this study is to fully operationalise service quality as a six-dimensional construct in the context of maritime transport, and findings on the ranking of dimensions/factors involved in the model. Although this is the first model of service quality in maritime transport with specific quality factors, its generic dimensions could be generalised to other service sectors as well. The research also has great managerial implications as managers across maritime transport companies can use the tool to develop questionnaire for customer satisfaction survey, thus facilitating a universal benchmarking approach across the industry.

Keywords Quality management, SERVQUAL, Freight forwarding, Customer services quality, Vietnam

Paper type Research paper

Introduction

The quality of products and services is of strategic importance to not only a company's business but also the national economy. While the strategic importance of quality is widely acknowledged, there has never been a universal approach to the definition of the concept of quality and its associated dimensions. Although there have been a number of well-known service quality models such as SERVQUAL which continues to inspire research on service quality, it is widely argued that the dimensions of service quality indicated in SERVQUAL are either too many or too few depending on the specific context of the research study. In addition, there is very little research done in maritime transport as a service sector on how service quality is defined and attributed.

In this paper, we aim to address these gaps in the literature and management practice by proposing and testing a new conceptual model of service quality dimensions in maritime transport verified by an empirical study conducted in Vietnam. The paper is organised in four main sections. First, a literature review is provided followed by the proposed conceptual model of service quality in maritime transport with dimensions and explaining factors. Methodologies are described next, followed by analyses and discussions on study findings. Implications for academic and management, as well as limitations of the study, are then devised. Finally, concluding comments and future research directions are outlined.

Quality in the service industry

Service quality, according to Babakus and Boller (1992), is specifically seen as ‘an umbrella construct with distinct dimensions’ although there is no real consensus as to what these dimensions might be. Various scholars have suggested a number of dimensions of quality service. Sasser *et al.* (1978) listed seven service attributes, namely (1) security; (2) consistency; (3) attitude; (4) completeness; (5) condition; (6) availability and (7) training. Gronroos (1978, 1982, 1984) 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. Following this, Lehtinen and Lehtinen (1982) defined service quality as a three-dimensional construct consisting of interactive, physical and corporate quality dimensions which are quite similar to Gronroos’s view. A number of detailed classifications of service quality dimensions have also been suggested by other researchers, e.g. the work of Parasuraman, *et al.* (1985, 1988) with their gap (PZB) model and later developed into SERVQUAL. While Parasuraman *et al.* (1988) claim 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. Babakus and Boller (1992) 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. This suggestion was also synchronised by the work of Cronin and Taylor (1992), Buttle (1996), Genestre and Herbig (1996), Mels, *et al.* (1997), and White and Galbraith (2000). 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 were conducted by Kang and James (2004), Liu (2005), Srikatanyoo and Gnoth (2005) and Fowdar (2005). Sureshchandar *et al.* (2002) also concluded that there are three new dimensions of quality beyond the two main factors of SERVQUAL.

Some other noteworthy studies were conducted by Haywood-Farmer (1988) with three elements or three Ps of service quality, Gronroos (1988) with a list of six criteria of good perceived service quality, LeBlanc and Nguyen (1988) with five groups of characteristics that explain perceived

quality in financial institutions, Brown (1988) with three dimensions, Ovretveit (1993) 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'. Johnston (1995) suggested 18 determinants of service quality, most of them are quality dimensions developed previously by Parasuraman *et al.* (1985, 1988). Harte and Dale (1995) summarised six general attributes that are required by customers as quality dimensions developed from SERVQUAL. Brady and Cronin (2001) proposed three dimensions, comprising the interaction quality, physical environment and outcome quality. Aldlaigan and Buttle (2002), meanwhile, 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 (Malhotra *et al.*, 1994; Buttle, 1996; Llosa *et al.*, 1998) 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, such as the studies conducted by Imrie *et al.* (2000, 2002) and Lin *et al.* (2000).

Table 1 summarises the review of selected literature on service quality dimensions. This table indicates 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 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.

While the summary of the literature review on service quality dimensions shows wide diversity in the quantity of dimensions as well as their essence, review of these various studies suggests that the dimensions of service quality can be generally classified into six groups, as follows:

- (1) *Resources-related quality dimension*: relates to physical resources, financial resources, condition of facilities, equipment, location, infrastructures, etc.
- (2) *Outcome-related quality dimension*: involves the product or core services being received by the customers, for instance, service accomplishment such as the on-time delivery of a shipment, or the price of a service offered.
- (3) *Process-related quality dimension*: basically relates to factors of interactions between employees and customers, for example, how customers perceive the behaviour of staff in dealing with customers' requirements, staff's knowledge of customers' wants and needs, as well as application of technology in better serving the customers.
- (4) *Management-related quality dimension*: involves the selection and deployments of resources in the most efficient way so as to ensure meeting/exceeding customers' needs and expectations, knowledge, skills and professionalism of employees and their understanding and transforming customers' needs and requirements into what they really want. This also relates to the feedback system from customers as new inputs for the new quality management cycle, as well as continuous improvement as suggested by various quality gurus.
- (5) *Image/reputation-related quality dimension*: relates to the overall perception of customers about the service organisation.
- (6) *Social responsibility-related quality dimension*: involves the ethical perception and operations of an organisation to behave in a socially responsible manner.

These dimensions were derived using an interpretive approach that attempted to find common ground between the dimensions identified in the literature. This model of service quality dimensions, though conceptualised through review of the literature, is theoretical and indicative only at this stage. In order to be applicable to this research, it needs to be tailored to the maritime transport industry which is discussed in the section that follows.

Service quality in maritime transport

Increasingly over past decades, there has been recognition from transport operators that improvement in transport service quality is critical in achieving a differential advantage over competition (Cotham, *et al.*, 1969). However, little literature directly addresses the dimensions or determinants of service quality in transport. Such dimensions or determinants are reflected only through the service factors in the selection criteria of transport elements, such as carriers or modes. A search of the related literature revealed that most of the literature addresses the issue indirectly through carrier or port selection decisions rather than directly through the attributes of quality dimensions of maritime transport-related services. Nevertheless, through the analysis and discussion of the selection variables based on groups of factors, one is able to identify the service- and performance-related attributes that are considered to be within the scope of dimensions of service quality.

Pearson's (1980) found the most important criteria are flexibility, first on the quay, speed of transit, reliability and regularity. The issue of carrier selection decisions in liner shipping was examined by Brooks (1985, 1990), in which the carrier selection criteria are frequency of sailings, transit time, directness of sailings, on-time pick-up and delivery, cost of service, cooperation between personnel, carrier flexibility, fast claims response, tracing capability of the carrier, sales representative, carrier's reputation for reliability, past loss and damage experience, informational nature of advertising and carrier appropriateness. Durvasula *et al.* (1999) revealed that SERVQUAL may be better represented by a more parsimonious (i.e. three-dimensional) factor structure. Slack (1985) is probably the pioneer scholar who examined the criteria that shippers use in their port selection decisions, which include size of port, port equipment, proximity of port, port charges, port security and congestion. Studied by Murphy, *et al.* (1989, 1991, 1992) showed

that equipment availability, shipment information and loss and damage performance are the three most important carrier selection factors among freight forwarders, while for international ports selection factors are equipment availability, loss and damage performance, large shipment capabilities and convenient pick-up and delivery time. Tongzon (2002) found that port efficiency is the most important factor in port choice and performance. Lopez and Poole (1998), meanwhile, indicated three dimensions contributed to the quality of port services, namely, efficiency, timeliness and security. Ugboma *et al.* (2004) found that all five SERVQUAL dimensions were valid. Meanwhile, Frankel (1993) found that the following nine criteria indicate the major quality concerns with regards to liner shipping services: reliability of service, time of service and maintenance of delivery time, availability of promised or advertised capacity, cargo safety, security and maintenance, cargo flow control and tracking, documentation and information flows effectiveness (timeliness and accuracy), Cost control, billing and cost management, service status control and projection, intermodal management.

The notion of service quality in maritime transport nowadays has far exceeded the scope of selection criteria decisions on carriers or ports. In a range of literature on quality in shipping, or 'quality shipping', quality has a broader definition than purely providing quality services, and contains many other elements. Quality shipping in practice is closely related to safety and environmental protection issues, as emphasised in Hawkins (2001), Bengtson (1992), MPA Singapore (2000). Botterill (1995) also stressed the important contribution that quality management can make to shipping where safety management is 85 per cent of ship management and safety management is 85 per cent of a quality management system. The critical importance of safety and environmental protection concerns also sheds light on a new and indispensable dimension of maritime transport services: corporate social responsibility. The shipping community and society nowadays are very concerned with the safety and environmental protection awareness and responsible behaviour of service providers in maritime transport. Undeniably, when an accident such as an oil spill occurs, it is not only the company's shareholders who suffer with loss of property, but also other stakeholders, for instance fishery and tourism industries, who have to bear the consequences of such an accident. It is no surprise then that in the shipping industry, corporate social responsibility is associated with the concept of quality, and quality services of maritime transport must incorporate this dimension. This viewpoint has been increasingly acknowledged by professionals, academia, international

governing bodies and stakeholders in the maritime transport industry, as reflected in the works of Ruiter (1999), Gratsos (1998), and Eliades (1992), and by some initiatives such as the Green Award (Green Award, 2004) and the Ecoports port project (Ecoports, 2004). It can be seen from the above that service quality in maritime transport means not only safe, reliable, efficient transport services but also socially responsible behaviour and activities regarding safety and environmental protection concerns.

The concept of service quality dimensions in maritime transport is summarised in Table II. It can be seen repeatedly from the table that key factors indicating quality in maritime transport are tangibles (infrastructure, availability of equipment and facilities), reliability of service performance (timeliness, accuracy, safety, security), responsiveness and empathy, and social responsibility.

The conceptual model

Earlier in this paper, the general conceptualisation of service quality dimensions was proposed as the general framework for quality dimensions in the service industries. Review of the literature on maritime transport services has also showed that identified attributes of selection decisions are represented within the quality dimensions of this conceptual model. From this analysis and synthesis, it is consequently suggested that, based on the interpretive review of selection variables in the literature, quality of maritime transport services is a construct comprising six dimensions with associated explaining factors and illustrated in Table III . The dimensions are:

- Resources-related dimension: Equipment and facilities availability, Equipment and facilities condition, Financial stability, Shipment tracing capability, Physical infrastructure
- Outcomes-related dimension: Speed of service performance, reliability of service performance (timeliness of shipment pick-up and delivery), providing service in a consistent manner, shipment safety and security (loss and damage), reliability of documentation (error-free processes), competitive price of service;

- Process-related dimension: Staff's attitude and behaviour in meeting customers' requirements (for example: changing customers' needs), Quick response to customers' inquiries, Knowledge of customers' needs and requirements, Application of IT and EDI in customer service;
- Management-related dimension: Application of IT and EDI in operations, Efficiency in operations and management, Knowledge and skills of management and operators, Understanding customers' needs and requirements, Feedback from customers, Continuous improvement of customer-oriented operation processes;
- Image/reputation-related dimension: Company's reputation for reliability in the market; and
- Social responsibility-related dimension: Socially responsible behaviour and concerns for human safety, Environmentally safe operations.

Research methodology

Research question and hypothesis

This study aims to examine the research question of how service quality in maritime transport is described and measured. Discussions from the earlier sections have come up with a service quality model of six dimensions and 24 factors. The research hypothesis is thus formulated as follows:

H₁: Quality of maritime transport service is a construct of 24 identified factors associated with six groups of resources, outcomes, process, management, image and social responsibility.

Methods of data collection

Triangulation is utilised in this study. Triangulation is strongly suggested in transportation and logistics research literature as an effective and useful technique to achieve the width and depth of

research issues, as demonstrated in the study by Cunningham *et al.* (2000). The type of triangulation technique employed in this paper is the methodological triangulation, in which the author uses and combines quantitative and qualitative methods to obtain a comprehensive understanding and a wide and deep picture of the study. The methods of data collection and interpretation used in this study are the survey method (by using mail questionnaires) followed by confirmatory in-depth interviews.

Sampling design

The sampling frame for this research is constructed from the directory of shipping companies, port operators and freight forwarders/NVOCCs in Vietnam listed in the *Visaba Times—Vietnam Shipping and Logistics Review*. A list of 197 maritime transport service-providing organisations including 66 shipping companies, 49 port operators and 82 freight forwarders/NVOCCs, is used as the mailing list for this research. By the cut-off date, 120 questionnaires for the survey were returned, of which 43 were from shipping companies, 36 from port operators, and 41 from freight forwarders. This represents a 61 per cent response rate.

For the in-depth interviews, it was decided that the same population and sampling frame should be used as for the survey. The process of selecting the samples for interviews was conducted carefully. First, the samples for interviews should be chosen only from within the respondents to these surveys. Secondly, since the research population consists of three categories of service providers, it is important that the sample chosen for qualitative research also reflect the representativeness of these categories. Geographical representativeness of the sample also needs to be assured. As the shipping companies, port operators and freight forwarders/NVOCCs are located all over the north, central and southern regions of Vietnam, the sample selected for in-depth interviews should also cover organisations in all these three regions. With these considerations in mind, 25 in-depth interviews were conducted during the study period.

Design of research instruments

Both fixed-alternative and open-ended response questions were utilised in the questionnaire, preceded by a cover letter using the letterhead of the author's institution. There are two questions in the questionnaire. In the first question, respondents were asked to rate the perceived importance of the 24 items measuring service quality in maritime transport on a 5-point category scale, starting from 1 as 'not at all important' to five as "very important". These items were randomly placed in the questionnaire so as to avoid the order bias. The second question is open-ended, encouraging respondents to supplement and rate any other attributes of service quality in their business sectors which were not listed in the first question. The questionnaire was originally written in English but later translated into Vietnamese. To ensure that the translation of the instrument in the target language is equivalent to the original language in which the instrument was developed, the process of translation of survey instruments was conducted through the consecutive stages of forward translation (English to Vietnamese), pre-testing (for both English and Vietnamese versions), modified translation (with feedback from instrument pre-testing), backward translation (modified Vietnamese version to English), and finalisation of Vietnamese version (based on comparison between backward translated English version and the original one).

Since the in-depth interviews aimed at prospective interviewees holding managerial positions, or 'elites', formal questionnaire-based interviews are not appropriate; instead, interviewees are given a great deal of freedom in explaining their answers to pre-determined topics. This means that the same topics, specifically in the form of some open-ended questions, were introduced in each interview but the sequence of questions asked changed over time from one interview to another, and the responses to these questions were in different orders and presented in different ways in different interviews. Moreover, some additional questions beyond the preliminary ones in order to follow-up and probe the interviewee's answers were also asked depending on the specific context in each interview.

Administering mail survey and conducting in-depth interviews

The questionnaire was pre-tested with a group of 10 organisations selected based on the author's judgement. Once this was completed and all feedback was incorporated to revise the questionnaire, the Vietnamese version of the questionnaire was put in envelopes, together with

the cover letter and self-addressed envelopes for returning the answers. A range of various tactics were employed to increase the response rate, such as using the cover letter from the author's institution, carefully phrasing the title of the questionnaire, applying personalisation and anonymity rule, etc.

Prior to the interviews, a list of prospective interviewees in various organisations was worked out, and each of these interviewees was contacted by telephone inviting their participation in the interviews. The list of prospective questions was also forwarded to those who agreed to participate in the interviews. The interviews were conducted on a one-to-one basis between the author and the interviewee, and varied approximately from 55mins to 1 hour and 15 Min. A tape recorder was used to record the whole interview with the prior consent of the interviewees.

Findings and discussion

Measurement scale reliability analysis

In this study, the statistical norm concerning the internal consistency adopted is above ± 2.0 , and the accepted value level of reliability (Chronbach's alpha value) is above 0.60 for the scale. Table IV shows the item-total correlation analysis and Chronbach's alpha value of the scale measuring perceptions of 24 service quality factors. The overall alpha value for the questionnaire is 0.7883, which indicates that the survey instrument is reliable.

Since the statistical norm concerning the internal consistency adopted in this study is above ± 2.0 , it is noted that there is a variable, SQ11 (competitive price of service), which shows a very low and even negative correlation with the sum of all other variables (-0.1941). Correspondingly, the alpha value would increase from 0.7883 to 0.8266 and become even more reliable if this variable were deleted from the scale. The negative value of the correlation in the case of this variable could be interpreted as there could be a relative number of responses positioned on the negative side of the scale, e.g. expressing that price is not important as an attribute of quality service, or service quality could be enhanced without implying higher price. This will be further elaborated in the later sections accordingly.

Perceptions of the proposed service quality factors

Table V shows the descriptive statistics data regarding perceptions of respondents in the survey of 24 factors of service quality in maritime transport. A test of significance using Z test (Zikmund, 2003) was also conducted to test the hypothesis.

As can be seen from Table V, the null hypothesis for all factors is rejected (since z observation values are all greater than z statistics values at 95 per cent confidence level), which means the alternative hypothesis is supported. This is also true at 99 per cent confidence level (z statistics is 2.57). All 24 factors have their mean scores above the midpoint of the scale, thus indicating that all of them are perceived as attributes of service quality in maritime transport. In this respect, the lowest mean score is 3.68 for the shipment tracing capability factor, but this is also very close to the “important” perceptions. This finding is quite consistent with the literature as this factor is also not highly ranked as a selection criteria in various earlier studies, such as in Brooks (1985, 1990). The finding about the consensus of the survey’s respondents is also echoed by the in-depth interviews’ informants. Specifically, in all 25 interviews, informants confirmed that all factors classified in the proposed groups are attributes of service quality in their business sectors, and service quality can not be achieved without them. While not yet taking into consideration the perceived importance of each factor, the interview informants also acknowledged that these groups of factors have reciprocal relationships with each other. The interview informants argue that these proposed service quality factors are the necessary conditions to make customers happy and satisfied. It is the coordination of all the factors that build up the service quality in maritime transport. A ship operator summarises this as follows:

...customer satisfaction means customers are satisfied with your service quality, for example, not simply carrying a container from point A to point B, but also knowing how smoothly and timely the containers are transported, how the documentation like Bill of Lading is processed and issued, how correct is the invoice, and customers can know where their containers are whenever they want to, etc.. This is the whole process.

The above confirmation of the new model of service quality in maritime transport in this study implies several noteworthy new findings as compared to earlier similar research. Firstly, it is safe

to say that it is one of just a few studies conducted so far in the field of service quality in maritime transport, and subsequently tested a new service quality model for this sector. Secondly, it confirms that service quality in maritime transport is not a unidimensional construct but encompasses a group of interrelated dimensions and associated factors. These factors, although being referred to sparsely from one study to another study in the literature as selection criteria as can be seen in Table II, have never been formally researched as quality factors of maritime transport service. This study, therefore, is meaningful in introducing a synthesised tool to measure service quality in maritime transport sector. Thirdly, this study also emphasises the two-aspect perception of service quality in maritime transport: management quality is as important as satisfying customers by meeting and/or exceeding their requirements/expectations. Indeed, while most similar studies in the literature base on customers' perception of factors such as firms' tangibles, reliability of service outcomes, etc. as key indicators of service quality, it is apparent from this study that management-related factors, such as efficiency of service performance, are important indicators of service quality in maritime transport and should also be incorporated in firms' service quality profile. Last but not least, this research introduces and confirms a new service quality dimension, social responsibility, which is seldom referred to in both generic service quality and transport service quality literature. It has been evidenced in this study that social responsibility-related quality factors such as responsible behavior and activities regarding safety and environmental concern are critical, which can enhance or damage the image or reputation of firms, and hence, the perceived quality of their service. Together with others, social responsibility-related quality factors form up a complete service quality profile for maritime transport organizations.

When it comes to the perceived ranking of each service quality factor, knowledge of customers' needs and requirements, and staff's attitude and behaviour in meeting customers' requirements are ranked as the foremost and second most important factors of service quality in maritime transport. Another factor which also focuses on the aspect of customer satisfaction is ranked the fifth most important factor (quick response to customers' inquiries and requests). Respondents also rank another factor related to the customer-focused management aspect, understanding customers' needs and requirements, as the sixth most important attribute of service quality. Another factor in this respect, continuous improvement of customer-oriented operation processes, interestingly, is ranked the seventh most important service quality factor. It is seen that, among

proposed service quality factors, survey respondents highly appreciate those factors involving the process of service provision as well as the management factors which all focus on satisfying the customers. Staff of the service provider should not only have a good knowledge of customers' needs and requirements, but they also have to quickly respond to customers' enquiries and requests, with a good attitude and behaviour so as to make customers happy in dealing with them. These factors establish the transaction interface between the service providers and their customers. As well as having the knowledge of customers' needs and requirements, staff of the service provider should also understand well these needs and requirements. Moreover, they need to have good knowledge and specialised skills in their areas of expertise, and continuously improve the customer-oriented operation processes so as to achieve efficiency in operations and management, thus contributing to good outcomes of service performance and a quality transaction process with the customers. These later factors are related to the management aspect of the service provider.

From another perspective, all these process and management-related service quality factors involve the centre of all quality systems: the human element. In broad terms, people are another resource of the organisation beyond the physical resources such as equipment and facilities. In the service industry where the product is not tangible as it is in the manufacturing sector, the involvement of the human element, here the staff of the service provider and its customers, in the transactions with customers as well as in operation and management processes, plays a critical role in providing a perceived quality service in the eye of the customer. It is strongly argued by the informants that the involvement of the human factor in the management would greatly affect other service quality factors, especially the effective utilisation of physical resources such as facilities and equipment as well as the transactions interface between the company's staff and their customers in providing good service outcomes. A port operator elaborated this as follows:

In fact, the process related factors such as staff behaviour and attitude are partly affected by the management in the port. If you have good management, your staff will have positive attitude and behaviour. So in fact management plays a very critical role in contributing to service quality.

Shipment safety and security is ranked as the eighth most important service quality factor. It is proved that the respondents perceive it as a compulsory responsibility of the service providers to ensure shipment safety and security (cargo loss and damage) as an aspect of the outcomes of

service quality, especially in maritime transport. This perception is also affirmed by the interview informants. In this respect, the issue of shipment or cargo safety and security is often considered as an indicator of service performance reliability. A port operator commented as follows:

...no matter how efficient your equipment and facilities are utilised and quick the service performance is, customers will not feel happy and satisfied if the reliability of your service performance is not assured, e.g. affected by many other factors in your operation and management system. If the security system in your port is not good, for example, there may be cargo theft and therefore this incurs lots of time for checking, examination, etc. Your customers, in this case both ship and cargo owners, will not be happy since your service is not reliable.

It is seen that service quality factors involving the process and management of service provision, or greatly related to the human element, are highly rated in the top half of the ranking table in terms of their importance. However, factors related to the company's physical resources and the outcomes of service performance are also appreciated. The importance of these factors varies from reliability of documentation ranked eleventh to physical infrastructure ranked nineteenth. Factors relating to the outcomes of service performance, such as reliability of service performance, speed of service performance, competitive price of service, and providing service in a consistent manner also receive high mean scores respectively. Other factors involving the company's resources such as equipment and facilities availability, equipment and facilities condition and financial stability are also ranked with relative importance. These resources and outcomes-related service quality factors are pre-requisites for a quality service as well as the results of service performance which make the customers satisfied and happy.

Although competitive price of service is perceived as an important service quality factor, the scale reliability analysis discussed in the earlier section proved that this factor is not sufficiently reliable to be included in the scale. Analyses from the descriptive and frequency tables and the interviews elaborate this. In fact, responses considering this factor as being not important account for 9.17 per cent of the total while the other 17.5 per cent perceive it as a neutral factor only. Standard deviation of this factor is also the largest among the factors (0.99), indicating that there is big gap among responses when compared with the average. This percentage of 9.17 per cent is also the largest among the responses favouring the perception of seeing some factors,

including competitive price of service, as unimportant in attributing to service quality. It is clear that there was a relatively large partition between respondents who view competitive price of service as a service quality factor and those who perceive it as a separate issue from service quality matters. In fact, this mixture of perceptions by the survey respondents is also reflected through the interviews with the informants. In the interviews, most informants acknowledged that price of service has long been a decisive factor for customers when they select a maritime transport service provider. One freight forwarder indicates that this is the most important service quality factor. Another freight forwarder argues that some companies can provide a not-too-bad service with a very competitive price, and thus are accepted by many customers. The philosophy in this respect is that good service is not always attained at a higher price, as argued by a freight forwarder below:

...even now when we mention the service of DHL, it is about three time more expensive than the others, although other companies may provide the same service, getting parcels to the destination safely, sometimes quicker than DHL, but their scope of operation is not that large as DHL and they have not yet built up their image and brand name like DHL. In return, the price of their service is just one-third of the one of DHL... Such companies operate on the basis of efficiency, light administrative mechanism, take advantages of all resources in order to provide the most competitive services, and their service quality is not that bad, at the average level, hence lots of customers accept them.

Some other informants argue that price of service should be separated from service quality, as they are two different issues. In this respect, they argue that the former cannot be used as an indicator for the latter, but rather as a factor comparative with service quality. Clearly, it can be seen from the above discussion that competitive price of service does not rank as reliable to be considered a service quality factor. The large diversification in responses to this factor in different extremes of the measurement scale, both in the survey and interviews, suggests that the factor should be eliminated from the scale so as to increase the measurement scale's reliability. It is thus appropriate and reasonable to drop this factor from the proposed service quality factors.

Among the least important service quality factors as perceived by the survey respondents are the two factors relating to social responsibility, namely, socially responsible behaviour and concerns for human safety, and environmentally safe operations. They are ranked the 22nd and 23rd most

important service quality factors. This perception about the two factors relating to the service provider's social responsibility is clearly reflected in the in-depth interviews, where a relatively large number of informants do not consider them necessary attributes of the service quality profile at the time being although acknowledging that they are quite important. Some other informants, however, argue that social responsibility factors are important as part of service quality performance. There are two arguments in this respect. Firstly, they acknowledge that these factors are currently receiving less emphasis than other service quality factors, but suggest that service providers must not discount them since they contribute to business sustainability. Some informants even argue that these factors will become a customer requirement in the long run as the general socio-economic situation of the country improves, and customers would then consider them as a part of the outcomes of service performance. Other informants further point out that concerns about social responsibility factors are both necessary to comply with regulations, and critical to enhance the company's image in customers' eyes. In turn, a better image would have positive impacts on customers' perceptions about the company's service quality. A typical statement of a freight forwarder illustrates this.

I think this dimension is now becoming one of the most important factors. If you want to do business in a sustainable manner, create stable jobs, and prolong your business, you ought to concern about social responsibility, e.g. safety and environmental protection.

Other recommended service quality factors

Regarding some newly proposed service quality factors arising from the interviews, two main themes developed from the discussion. Firstly, some informants argue that the service provider's ability to provide a variety of services following customers' requirements, any time and anywhere, also contributes to service quality. This is true from the perspective of the customer-based quality definition approach, since whether the service provider can satisfy whatever the customers want, at any time, anywhere, would greatly contribute to customer satisfaction, without yet taking into consideration the issue of how these services are provided. These are outcomes of service provision as well, as the service provider would utilise and effectively manage its resources to provide various services as, when and where customers want them.

These factors can in fact be grouped into one new factor entitled diversification and availability of service provision in terms of time and place. This factor can be included in the group of outcomes of service performance. Secondly, many informants emphasise the service provider's capability of handling situations such as incidents or crises. It is argued that in normal situations service providers may seem to be comparative with each other, and only those who have good situational handling capability would prove themselves with good service quality. This also includes the service provider's willingness to cooperate with customers to solve problems when there is an incident, since such an attitude and behaviour would enhance the service provider's good image in the customers' eyes. Other informants highlight that service quality does not stop when the service is actually provided, but also includes the post-sale stage where customers may need the service provider to handle any incidents that may arise with empathy and professionalism. A port operator's statement illustrates this.

... we need to go with customers to the end of the service performance process. In this respect I mean we have to be professional and helpful with customers to solve any incident happening during this process. If we just deliver the container to customers at the port's out-going gate and wash our hands, we are not actually completing our service performance. I want to emphasise that the capability of handling the crisis when something occurs is very important in service quality as well, since customers may look at that as the management capability of the service provider.

What was suggested in the interviews regarding the service provider's capability of incident handling is valid as one aspect of the service provider's professionalism and capability profile. While this factor has been actually mentioned in the author's proposed factor framework (entitled knowledge and specialised skills of management and operators), it is without further explanation about the capability of incident handling. It is therefore appropriate to reword this factor as knowledge and specialised skills of management and operators including incident handling capability in order to capture the essence of the new factor proposed by respondents and informants.

The revised model of service quality in maritime transport is thus presented in Table VI.

Implications, limitations and direction for future research

Academic implications

This research has several academic implications. Firstly, it helps fill the gap in the literature about service quality factors in maritime transport, as it has been identified earlier that there has been very few studies conducted to investigate what constitute service quality in this field. Furthermore, most similar studies attempt to investigate mode or carrier selection criteria, and not explicitly examine what factors indicating service quality in maritime transport might be. Quality dimensions such as management efficiency and social responsibility are confirmed to be very important in indicating service quality of maritime transport organisations. Secondly, although the model of service quality in this research was designed and tested specifically with a group of maritime transport organisations, its application could be generalised to other service sectors. Although the model of service quality in this study has factors dedicated to maritime transport, its six dimensions are rooted in and built from general service quality literature. Researchers with interest in service quality in other service sectors can use this model's dimensions as a general framework model while individual factors within each dimension can be developed tailor-made to each specific sector. To this end, the model developed and tested in this research is of contribution to enrich both generic and maritime transport service quality literature.

Managerial implications

The managerial implications of this research are two-fold. Firstly, as it has never been a universal approach to measuring service quality in maritime transport sector, this research provides managers in maritime transport organisations a useful tool for that purpose. Managers can use the model designed and tested in this research to develop a research instrument, such as questionnaire, to survey their customers' evaluation of quality of service provided. On the one hand, this is of great meaning to maritime transport service organisations, such as shipping and port companies, in getting feedback from their customers and thus facilitating their service improvement. On the other hand, the use of a universal research instrument to measure service quality by maritime transport organisations would also greatly facilitate benchmarking across

organisations in the industry, as the same metrics is used. This, in turn, would enhance the image of the industry as a whole. Secondly, the ranking of service quality factors in this research, though is of reference only to managers as it has just been tested in a single country, would provide insights to areas of service quality which should be focused upon. For example, care must be specially given to the process of service provision where employees' knowledge, professionalism, attitude and behaviour are important to enhance the firm's service quality image. Service outcomes, such as reliability of service performance, safety and security, as well as social responsibility behaviour and activities also account for a critical part to indicate service quality in maritime transport.

Limitations and direction for future research

This research has a major limitation which needs to be acknowledged. As this is the first stage of a more comprehensive study, the service quality model developed in this research was tested only with service providers - maritime transport organisations. Future research direction is desired, e.g. conducting the study using the same instruments on customers and compare the gaps with this research in order to strengthen the validity and reliability of the dimensions and factors in the model. Nevertheless, this research lays the foundation for enhanced knowledge on service quality in maritime transport by establishing service quality factors as initially perceived by service providers.

Conclusion

This paper reviews the concept of service quality and its dimensions in maritime transport as a service industry, and specifically aims at devising and empirically testing a conceptual model of service quality in maritime transport. The literature review has shown that quality is not a universal concept, and that it incorporates many dimensions. Nevertheless, a synthesis from this review has led to a proposal of a service quality model which consists of six dimensions: Resources, Outcomes, Process, Management, Image, and Social responsibility (ROPMIS). This conceptual model of service quality is further explored in the context of maritime transport to

elaborate the specific service quality factors in this industry, consisting of six groups and 24 factors. Through analyses and discussions of empirical findings, it has been proved that the proposed model of six dimensions and 24 service quality factors are verified by both survey respondents and interview informants, with one factor dropped from the original scale while a new factor included and an existing factor modified. It is apparent from this research that quality factors related to the process of service provision such as employees' knowledge and behaviour in meeting customers' requirement, to management quality such as efficiency, and to service outcomes such as reliability and safety/security profile are highly ranked. This indicates the importance of human element in service quality systems and emphasises the need for employee training and education as part of quality management and improvement. In addition, managers in maritime transport organisations can utilise the tool developed in this research to conduct survey of customer satisfaction of their service quality. The universal use of such a tool across companies will also facilitate benchmarking and thus enhance image of the industry as a whole. While the service quality model in this research provides some contribution to related literature and management practice, several future research directions must be pursued, such as conducting the study using the same instruments on customers and compare the gaps with this research, or conducting the study in another business context. These aim to enhance the validity and reliability of this research's instruments and findings.

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Year	Author(s)	No. of dimensions	Details	Comments
1978	Sasser <i>et al.</i>	07	Security, consistency, attitude, completeness, condition, availability, training	Basically, these dimensions can be classified in to the following groups: quality of physical assets, reliability of service, quality of service delivery processes These dimensions cover all those proposed by Sasser <i>et al.</i> and also proposed the corporate image or reputation as a dimension
1978, 1982, 1983, 1984, 1988, 2001	Gronroos	03	Technical quality of outcome, functional quality of process, corporate image	
1982	Lehtinen and Lehtinen	03	Interactive quality, physical quality, corporate quality	
1985	Parasuraman <i>et al.</i>	10	Reliability, responsiveness, competence, access, courtesy, communication, credibility, security, understanding/knowing customer, tangibles	These three dimensions are quite similar to those proposed by Gronroos This separation of dimensions is very detailed; the main essence of the dimensions is basically to with Sasser <i>et al.</i>
1988	Parasuraman <i>et al.</i>	05	SERVQUAL: tangibles, reliability, responsiveness, assurance, empathy	Same as above
1988	Haywood-Farmer <i>et al.</i>	03	Physical facilities, processes and procedures; people's behaviour and conviviality; professional judgement	The essence of these dimensions encompasses the content of those proposed by previous authors such as Sasser <i>et al.</i> ; Gronroos; Parasuraman, Zeithaml and Berry. The added element is the professionalism of the service provider
1988	Gronroos	06	Professionalism and skills; attitudes and behaviour; accessibility and flexibility; reliability and trustworthiness; recovery; reputation and credibility	The added dimension, "recovery", to some extent can be considered as the additional element of professionalism in that the service provider is proactive in dealing with customer relationship management

(continued)

Table I

Year	Author(s)	No. of dimensions	Details	Comments
1988	LeBlanc and Nguyen	05	Degree of customer satisfaction; internal organisation; physical environment and instruments supporting service-producing system; corporate image; personnel/customer interaction	Basically, these dimensions are in line with previous identified determinants
1988	Brown	03	Accomplishment; behaviour; products	These dimensions also emphasise the essence of those in previous studies.
1992	Babakus and Boller	01	Performance	Although this separation is simple, it may not reflect the true scope of service quality dimensions since the study was conducted in a very unique case with extraordinary characteristics
1992	Cronin and Taylor Ovretveit	01	Performance	Same as above
1993		03	Customer or client quality; professional or technical quality; management quality	It can be seen that the dimensions proposed by Ovretveit were inherited from previous studies. His new dimension, management quality, suggested a new insight as it referred to the internal and external management aspect.
1995	Johnston	18	Mostly based on dimensions of Parasuraman <i>et al.</i> (1985, 1988)	The essence of these dimensions are in line with those in previous studies of Parasuraman <i>et al.</i>
1995	Harte and Dale	06	Timeliness; empathy; assurance; fees; tangibles; reliability	Basically, this separation of dimensions is similar to SERVQUAL; the timeliness dimension to some extent can be included in the reliability.
1996	Buttle	06	SERVQUAL + 01 dimension indicating the outcome	In fact, this dimension indicating the outcome has been mentioned previously by Gronroos and others

(continued)

Table I

Year	Author(s)	No. of dimensions	Details	Comments
1996	Genestre and Herbig	06	SERVQUAL+01 dimension of product quality	In fact, this new dimension has also been previously referred to by Brown Basically, these two dimensions are similar to the technical and functional quality developed by Gronroos
1997	Mels <i>et al.</i>	02	Extrinsic quality; intrinsic quality	
2000	White and Galbraith	13	Reliability; responsiveness; competence; commitment; access; availability; communication; understanding; flexibility; tangibles/functionality/technology; credibility/integrity; courtesy/friendliness; helpfulness/care	
2000	Imrie <i>et al.</i>	07	Tangibles; reliability; responsiveness; assurance; generosity; politeness and courtesy; sincerity	Although the empathy dimension in SERVQUAL was broadly elaborated into three new dimensions, the true essence of total dimensions are the same. The noted meaning of this study is its implication in the Asian context
2000	Lin <i>et al.</i>	07	Tangibles; reliability; responsiveness; assurance; generosity; politeness and courtesy; sincerity	Same as above
2002	Imrie <i>et al.</i>	07	As above. The latter three are grouped into the so-called "interpersonal relations"	Same as above
2001	Brady and Cronin	3 dimensions + 3 sub-dimensions	Outcome, interaction, environmental quality	These dimensions match Gronroos' model
2002	Aldlaigan and Buttle	4 dimensions	Service system quality, behavioural service quality, service transactional accuracy, machine service quality	These dimensions are classified into Gronroos' two dimensions of technical and functional service quality

(continued)

Table I

Year	Author(s)	No. of dimensions	Details	Comments
2002	Sureshchandar <i>et al.</i>	05	Human element; tangibles; core service; non-human element; social responsibility	Three new dimensions are worth considering. The core service is more or less similar to the outcome, or product dimension; the non-human element has the same focus as management quality; the social responsibility is a totally new dimension which is in line with the new conceptualisation of the "customer" construct
2003	Santos	02	Incubative (ease of use, appearance, linkage, structure and layout, content); active (reliability, efficiency, support, communication, security, incentives)	These dimensions are classified into Gronroos' two dimensions of technical and functional service quality
2004	Jun <i>et al.</i>	06	Reliable/prompt responses, access, ease of use, attentiveness, security, and credibility	These dimensions are developed from and rooted in SERVQUAL
2004	Yang <i>et al.</i>	06	Reliability, responsiveness, competence, ease of use, security, and product portfolio	Same as above
2004	Kang and James	03	Three dimensions of Gronroos' model	This study confirmed the validity of Gronroos' model and found it more appropriate than SERVQUAL
2004	Liu	03	The customer-employee interaction, the service environment and the outcome	These dimensions were derived from models of Gronroos and Parasuraman <i>et al.</i>
2005	Srikatanyoo and Gnoth	06	Academic and supporting facilities, academic staff performances, environmental conditions, entry requirements, academic reputation of a country, and academic reputation of domestic institutions	These six dimensions were derived from models of Gronroos and Parasuraman <i>et al.</i> and used specifically in international tertiary education
2005	Fowdar	07	05 dimensions of SERVQUAL and two additional dimensions: core medical outcomes and professionalism/skill/competence	These dimensions were based on SERVQUAL and specific to health care settings

Table I

Authors	Resources	Service quality dimensions and typical attributes/factors				Social responsibility
		Outcomes	Process	Management	Image/reputation	
Pearson (1980)		<ul style="list-style-type: none"> –Speed of transit –Reliability –Regularity 	<ul style="list-style-type: none"> –Flexibility –First on the quay – 			
Brooks (1985, 1990)	<ul style="list-style-type: none"> –Tracing capability –Sales representative 	<ul style="list-style-type: none"> –Salings frequency –Transit time –Directness of sailing –On-time pick-up and delivery –Cost of service 	<ul style="list-style-type: none"> –Cooperation between personnel –Carrier flexibility 		<ul style="list-style-type: none"> –Reputation for reliability –Lost and damage experience –Informational nature of advertising –Carrier appropriateness – 	
Slack (1985)	<ul style="list-style-type: none"> –Size of port –Port equipment –Proximity of port 	<ul style="list-style-type: none"> –Port security –Port charges 	<ul style="list-style-type: none"> – 	<ul style="list-style-type: none"> –Congestion – 		
Murphy <i>et al.</i> (1989, 1991, 1992)	<ul style="list-style-type: none"> –Large and/or odd sized freight –Large volume shipment –Special handling –Equipment availability –Shipment information 	<ul style="list-style-type: none"> –Loss and damage –Pick-up and delivery –Handling charge 	<ul style="list-style-type: none"> –Claim handling 	<ul style="list-style-type: none"> – 	<ul style="list-style-type: none"> – 	
Frankel (1993)	<ul style="list-style-type: none"> –Availability of capacity –Cargo flow control and tracking 	<ul style="list-style-type: none"> –Service reliability –Service time and delivery time –Cargo safety, security and maintenance –Timeliness and accuracy –Cost control, billing and management 	<ul style="list-style-type: none"> – 	<ul style="list-style-type: none"> –Service status control and projection –Intermodal management 	<ul style="list-style-type: none"> – 	

(continued)

Table II

Authors	Resources	Service quality dimensions and typical attributes/factors			
		Outcomes	Process	Management	Image/reputation
Lopez and Poole (1998) Durvasula <i>et al.</i> (1999)	–	–Timeliness –Security –Reliability	–	–Efficiency	–
	–Tangibles		–Responsiveness –Assurance –Empathy	–	–
Tongzon (2002)	–Adequate infrastructures –Location –Frequency of ship visits	–Competitive port charges	–Quick response to port users' needs	–Port efficiency	–Port's reputation for cargo damage
	–	–Safety –Reliability	–	–Efficiency	–
Gratsos (1998), Ruiter (1999), Eliades (1992)					– Responsibility behaviour and activities regarding safety and environment concerns –
Ugboma <i>et al.</i> (2004)	–Tangibles	–Reliability	–Responsiveness –Empathy	–Assurance	–

TableII

Dimensions	Factors	Codes
Resources	1. Equipment and facilities availability	SQ1
	2. Equipment and facilities condition	SQ2
	3. Financial stability	SQ3
	4. Shipment tracing capability	SQ4
	5. Physical infrastructures	SQ5
Outcomes	6. Speed of service performance	SQ6
	7. Reliability of service performance (timeliness of shipment pick-up and delivery)	SQ7
	8. Providing service in a consistent manner	SQ8
	9. Shipment safety and security (loss and damage)	SQ9
	10. Reliability of documentation (error-free processes)	SQ10
	11. Competitive price of service	SQ11
Process	12. Staff's attitude and behaviour in meeting customers' requirements (e.g. changing customers' needs)	SQ12
	13. Quick response to customers' inquiries and requests	SQ13
	14. Knowledge of customers' needs and requirements	SQ14
	15. Application of IT and EDI in customer service	SQ15
Management	16. Application of IT and EDI in operations	SQ16
	17. Efficiency in operations and management	SQ17
	18. Knowledge and skills of management and operators	SQ18
	19. Understanding customers' needs and requirements	SQ19
	20. Feedback from customers	SQ20
	21. Continuous improvement of customer-oriented operation processes	SQ21
Image	22. Company's reputation for reliability in the market	SQ22
Social responsibility	23. Socially responsible behaviour and concerns for human safety	SQ23
	24. Environmentally safe operations	SQ24

Table III

Service quality factors	Scale mean if item deleted	Alpha = 0.7883		Alpha if item deleted
		Scale variance if item deleted	Corrected item-total correlation	
SQ11	97.1500	36.9017	−0.1941	0.8266
SQ3	97.2583	33.6218	0.2334	0.7858
SQ8	97.2333	32.6006	0.2696	0.7855
SQ18	96.6250	33.7658	0.2568	0.7843
SQ10	96.8667	33.5787	0.2652	0.7840
SQ9	96.7750	33.5540	0.2898	0.7829
SQ1	96.9167	33.2199	0.3023	0.7822
SQ4	97.5333	33.1249	0.3031	0.7822
SQ20	96.8333	32.9636	0.3359	0.7805
SQ14	96.6083	33.2151	0.3416	0.7804
SQ5	97.3417	33.2184	0.3510	0.7801
SQ19	96.7000	32.9681	0.3610	0.7794
SQ6	97.0500	33.2076	0.3881	0.7788
SQ13	96.6500	32.7168	0.3922	0.7777
SQ7	96.9833	33.0417	0.4122	0.7777
SQ2	97.1000	32.5277	0.3916	0.7775
SQ21	96.7000	32.6992	0.4052	0.7772
SQ17	96.6250	32.6397	0.4375	0.7759
SQ16	97.3417	32.5461	0.4526	0.7751
SQ12	96.6083	32.4083	0.4488	0.7749
SQ22	96.8417	32.2016	0.4433	0.7747
SQ15	97.3750	32.1355	0.4831	0.7730
SQ23	97.4000	31.0487	0.4666	0.7720
SQ24	97.4667	30.8728	0.4864	0.7706

Table IV

Service quality factor	Mean	SD	Rank	Z statistics (95% confidence)	Z observation
SQ14	4.61	0.52	1	1.96	33.67
SQ12	4.61	0.55	2	1.96	31.77
SQ18	4.59	0.51	3	1.96	34.17
SQ17	4.59	0.53	4	1.96	33.11
SQ13	4.57	0.56	5	1.96	30.59
SQ19	4.52	0.55	6	1.96	30.22
SQ21	4.52	0.55	7	1.96	30.22
SQ9	4.44	0.52	8	1.96	30.65
SQ20	4.38	0.58	9	1.96	26.02
SQ22	4.38	0.59	10	1.96	25.32
SQ10	4.35	0.54	11	1.96	27.15
SQ1	4.30	0.57	12	1.96	24.81
SQ7	4.23	0.48	13	1.96	28.12
SQ6	4.17	0.47	14	1.96	27.00
SQ2	4.12	0.60	15	1.96	20.50
SQ11	4.07	0.99	16	1.96	11.86
SQ8	3.98	0.77	17	1.96	14.05
SQ3	3.96	0.59	18	1.96	17.93
SQ5	3.88	0.51	19	1.96	18.74
SQ16	3.88	0.53	19	1.96	18.17
SQ15	3.84	0.57	21	1.96	16.32
SQ23	3.82	0.76	22	1.96	11.84
SQ24	3.75	0.76	23	1.96	10.83
SQ4	3.68	0.59	24	1.96	12.61

Notes: relative ranking based on factors' mean scores; 1 = not at all important, 5 = very important

Table V

Dimensions	Factors
Resources	<ol style="list-style-type: none"> 1. Equipment and facilities availability 2. Equipment and facilities condition 3. Financial stability 4. Shipment tracing capability 5. Physical infrastructures
Outcomes	<ol style="list-style-type: none"> 6. Speed of service performance 7. Reliability of service performance (timeliness of shipment pick-up and delivery) 8. Providing service in a consistent manner 9. Shipment safety and security (loss and damage) 10. Reliability of documentation (error-free processes) 11. Diversification and availability of service provision in terms of time and place
Process	<ol style="list-style-type: none"> 12. Staff's attitude and behaviour in meeting customers' requirements (e.g. changing customers' needs) 13. Quick response to customers' inquiries and requests 14. Knowledge of customers' needs and requirements 15. Application of IT and EDI in customer service
Management	<ol style="list-style-type: none"> 16. Application of IT and EDI in operations 17. Efficiency in operations and management 18. Knowledge and skills of management and operators, including incident handling capability 19. Understanding customers' needs and requirements 20. Feedback from customers 21. Continuous improvement of customer-oriented operation processes
Image Social Responsibility	<ol style="list-style-type: none"> 22. Company's reputation for reliability in the market 23. Socially responsible behaviour and concerns for human safety 24. Environmentally safe operations

Table VI