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Article

Logistics service quality and customer satisfaction: Evidence from Salalah Port in Oman

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Abstract: **Purpose**—Quality service plays a significant role in enhancing customer satisfaction and loyalty. The main objective of this research is to investigate the effect of Salalah port service quality on customer satisfaction. **Design/methodology/approach**—This paper used a quantitative research design. Data were collected from 300 repeated customer of Salalah Port in Oman. Statistical Package (SPSS) version 25.0 was used for analysis of data and adopted to test the hypothesized model. **Findings**—The research findings confirm the positive influence of the five dimensions of service quality – tangible, empathy, reliability, responsiveness, assurance (TERRA) on customer satisfaction. **Originality/value**—The findings of this study develop the literature by adding empirical research evidence that the TERRA of Salalah port service quality which have a significant effect on customer satisfaction. The result also provide evidence from the Arab region where the data and research in this region are limited.

Keywords: logistic service quality; customer satisfaction; Salalah; Oman

1. Introduction

Currently, Oman has two main strategic seaports for the movement of commodities from outside and into Oman, and one additional seaport, Duqm Port, is still under construction. Originally Sultan Qaboos Harbor was the main gateway to Oman, but recently in order to promote tourism in the old city of Muscat and reduce truck traffic from the capital, it has been converted into a dedicated tourism port (Al-Ansi, 2022; Cordts et al., 2016). The main ports in Oman are the ports of Sohar and Salalah, each with a free zone to promote export-oriented industries and attract foreign investment, both are strategically located at the opposite ends of the country, while Duqm is located more centrally facing the Indian Ocean away from the Strait of Hormuz. Due to the escalating issues between Iran and the Arab World, the Strait of Hormuz has become an international focal point.

Service quality in transportation is a critical factor that directly impacts customer satisfaction and loyalty (Grönroos, 1984). Professional transportation services strive to provide a seamless and efficient experience for shipping, whether it be through prompt import or export, clean and well-maintained vehicles, courteous drivers, or effective communication channels. By focusing on timely service delivery and consistently meeting customer expectations, transportation companies can build a positive reputation and differentiate themselves from competitors in the industry (Kartikasari and Albari, 2019). Additionally, providing additional amenities such as Wi-Fi connectivity, safe delivery, and logistics can further enhance the overall

shipping experience. Ultimately, attentiveness to service quality in transportation is essential for ensuring customer retention and attracting new clientele in today's competitive market.

Salalah seaport, established since 1998, has grown very rapidly to become the leading and most reputable multi-harbor in the Oman region and in 2021 was ranked as the second most efficient container port in the world. Salalah Port aims to become a reliable regional supply chain center of technology and human resources. With the support of an excellent integrated supply chain ecosystem which includes Seaports, Free Zones and Airports, the Port of Salalah serves as an effective platform for unhindered international trade. Harmonized sea, land and air multi-modal connectivity enables importers and exporters to easily and quickly access their global markets and increase efficiency and competitiveness (https://www.salalahport.com.om/).

This research was conducted in Dhofar Province, specifically this research was conducted in the city of Salalah. Salalah is located in the southern part of Oman, approximately 1000 km from Muscat. Salalah is considered the second largest city in Oman and is located between 40°14′ N and 40°05′ N and 25°39′ E to 26°00′ E longitude on the map, as shown in **Figure 1**.

Figure 1. Location port in Oman.
Source: Satellite photo of google map, 2022.

Organization of the paper: the rest of the paper includes: section 2. theoretical framework, service quality model and its five dimensions, service quality performance, attendance and mediator model. Section 3. Research methodology including process, model, hypotheses, sampling techniques and respondent profile. Section 4. Research results including validity and reliability, processing data statistics, summary factor analysis for SERQUAL, correlation and testing hypotheses. Section 5. Discussion while Section 6 and 7 included conclusion and future research

directions.

2. Theoretical framework

Logistics is an important element of economic development in every country even around the world. In essence, logistics is an essential and central feature of all economic activity, because without a good logistics system, the flow of goods and services will not work properly (Beysenbaev and Dus, 2020; Khanlu et al., 2019). Therefore, the logistics industry has both direct and indirect economic influence, and improvements in logistics management and a push towards more efficient supply chains provide excellent opportunities for economic growth (Muduli and Barve, 2013). Furthermore, ports serve as crucial hubs for the global circulation of resources, bridging the gap between terrestrial and maritime transportation and sustain the creativity through industries (Kim, 2013). In the contemporary period, port logistics exhibits attributes of unified services, expansive logistics, and abstract chains. To keep pace with the ever-evolving demands of global port logistics, modern ports must incessantly refine their logistics functions (Ba Awain et al., 2023). Hence, evaluating port services becomes imperative in order to align with the internationalization of port logistics, thereby enhancing the fundamental competitive edge of port logistics.

2.1. Service quality gap model

Parasuraman et al. (1985) stated that service quality is achieved if a business can close the gap between customer expectations and their perceptions. Therefore, the service quality model of Parasuraman et al. (1985) was based on a gap analysis of service quality and customer perceptions of the services provided.

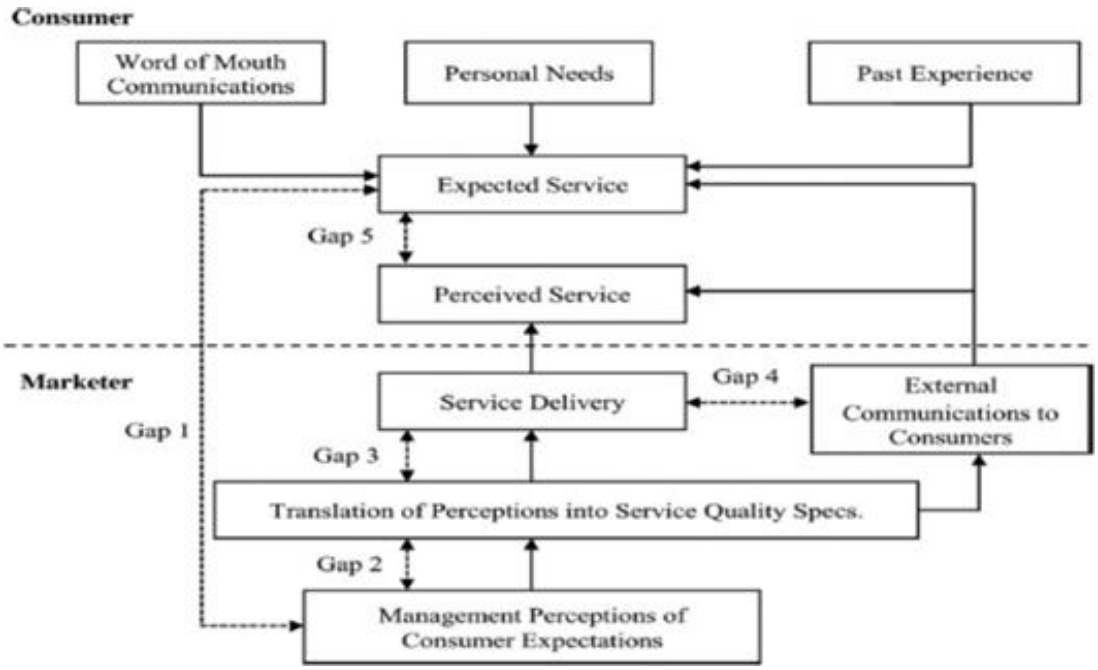

Figure 2. The service quality gap model.
Source: Adapted from Parasuraman et al. 1985.

Figure 2 illustrates the following service gaps: (1) Gap 1 represents the disparity between the customer's expected service and the management's perception of this expectation. This gap arises when management fails to understand how customers formulate their expectations from the information available to them. (2) Gap 2 denotes the divide between management perceptions and service standards. The creation of this gap can be attributed to a lack of managerial commitment to deliver high-quality service, or a perception that the company lacks the capability to fulfil customer expectations. (3) Gap 3 highlights the incongruity between established service standards and the actual service delivery. This gap can emerge due to numerous factors such as poor team coordination, inappropriate employee selection, insufficient training, and unsuitable job designs. Customer expectations are shaped by the company's advertising media and various forms of communication. (4) Gap 4 signifies the disparity between the delivered service and the customer's perception, which refers to the differences between the provided services and the external communications. This gap often arises from overpromising and a lack of information provided to prospective customers. It is vital for the company to align the information given to potential customers with the actual service evidence presented (managing the evidence). (5) Gap 5 refers to the divergence between customer perception and customer expectation (Maharsi et al., 2021; Muduli and Barve, 2013). This gap ultimately determines customer satisfaction. Minimizing the first four gaps linked to service delivery significantly influences customer satisfaction, as noted by Parasuraman et al. (1988).

The Serv-Qual model, initially developed by Parasuraman et al. (1988) and later expanded upon by Zeithaml et al. (1990), has been employed to assess customer perceptions regarding the quality of service (Nguyen et al., 2017; Gerbing and Anderson, 1988). This model encompasses five dimensions, namely tangibles, empathy, reliability, responsiveness, and assurance, collectively referred to as TERRA. The detailed depiction of these dimensions is provided in **Table 1**.

Table 1. Dimension of service quality (SERVQUAL) model.

Dimension	**Definition**	
	Parasuraman et al. (1988)	**Zeithaml et al. (1990)**
Reliability	The company's capacity to provide services in a prompt and consistent manner.	The ability of the business to perform the promised service reliably and accurately.
Responsiveness	The firm's eagerness to assist customers swiftly and address issues effectively when they arise unexpectedly.	The business willingness to help customers and provide prompt service.
Assurance	The enterprise's capability to foster customer trust by demonstrating professionalism, courtesy, customer respect, strong communication skills, and a caring demeanor, all of which contribute to top-tier customer support.	Knowledge and courtesy of employees and their ability to inspire trust and confidence.
Empathy	The service approach of the employees, marked by attentiveness, compassion, ability to comprehend customer needs, and a knack for instilling feelings of safety and security in customers.	Caring, easy access, good communication, customer understanding and individual attention given to customers.
Tangibles	The visual presentation of facilities, equipment, employee uniforms, and the goods and materials employed in service provision.	Appearance of physical facilities, equipment, personnel and written materials.

Based on a review of relevant literature, it has been observed that different

authors have suggested varying dimensions of service quality. For a quick reference, **Table 2** presents an overview of all the service quality dimensions proposed by various scholars.

Table 2. Possible approach to analyzing service quality dimensions.

Dimensions	Specific elements	(Lewis, 1993)	(Parasuraman et al., 1988)	(Sureshchandar et al., 2002)	(Avkiran, 1999)
Tangibles	Staff s neat dress	X			X
	Staff's professional appearance				
	Buildings	X			X
	Leaflets	X			X
Reliability	Credibility	X			
	Timely service	X			
	Accuracy of records	X			
	Dependability	X			
Responsiveness	Staff conduct				
	Willingness of staff to help customers				
	To provide prompt of service				
Assurance	Staff's knowledge	X			
	Politeness of staff				
	Staff's courtesy	X			
	Trustworthiness and confidence	X			
Empathy	Good communication	X		X	
	Individual attention	X	X	X	
	Customer understanding	X			
	Access to teller services	X			
Social responsibility	Good service at a reasonable cost	X			
	Staff's sense of public responsibility	X			

Source: (Lewis, 1993), (Parasuraman et al., 1988), (Sureshchandar et al., 2002), (Avkiran, 1999).

2.2. The SERVPERF performance

Cronin and Taylor (1992) conducted research on the sand method for assessing service quality and customer satisfaction, concluding that factors related to consumer perception were superior indicators of service quality. Their model of service quality measurement, termed SERVPERF, provides a straightforward and effective approach to gauging service quality. They questioned the clarity of Parasuraman's SERVQUAL model, arguing that it could potentially confuse customer satisfaction with customer attitudes, resulting in inaccuracies in the measurement of service quality. Cronin and Taylor further suggested that service quality can be better defined as a "perceived attitude" rather than "performance as expected", recommending service quality assessment based on actual business performance (Al-Ansi, 2022; Jaboob et al., 2023) In this perspective, service quality is evaluated solely through customer perception, without a consideration of customer expectations, implying that service quality is deemed satisfactory at the level of perception.

While the SERVQUAL model serves as an effective measure in many industries, there have been instances where its suitability has been questioned, particularly in the retail sector (Dabholkar et al., 1996). Some scholars have debated its comprehensiveness in various applications (Brady and Cronin, 2001a; Dabholkar et al., 1996; Shahin and Samea, 2010). In 1992, Cronin and Taylor (1992) proposed an improved model that positioned performance as the sole variable needing measurement for service quality. They contended that consumer attitudes constituted service quality and that service performance was the exclusive measure of service quality. Their research examined the relationship between service quality, customer satisfaction, and purchase intention, positing that service quality was a precursor to customer satisfaction (Cronin and Taylor, 1994; Al-Ansi et al., 2023). They introduced a new model, SERVPERF, which was based on SERVQUAL but measured service quality using performance as the only factor. This model continued to use the same dimensions as reliability, responsiveness, assurance, tangibles, and empathy for measuring service quality, but it did not focus on the "expectation-perceived" differences. Research outcomes suggest that SERVQUAL factors can be inconsistent, and SERVPERF offers a more precise measure of service quality compared to SERVQUAL.

2.3. The antecedents and mediator model

This model may indeed be considered a comprehensive service quality model, as it integrates elements of antecedents, mediators, and outcomes to offer a nuanced understanding of the interrelated notions of service quality. The model scrutinizes the concept of service quality via four factors, namely: Reliability, Personal attention, Convenience, and Features. These factors influence service quality as antecedent components and also illuminate the relationship between service quality, customer satisfaction, and behavioral intentions.

Table 3. Theoretical model of service quality.

Research model	**Dimensions/characteristics**
Technical and functional quality model (Nguyen et al., 2015)	Technical quality; functional quality; image.
Model of service quality gaps (Hyung et al., 2016)	Reliability; responsiveness; competence; access; communication; courtesy; credibility; security; understanding; tangibles, Reliability; responsiveness; empathy; assurance; tangibles.
SERVQUAL model (Compés López and Poole, 1998)	Reliability; responsiveness; empathy; assurance; tangibles; Convenience of making an appointment; staff's friendliness; staff listen to questions; staff provide accurate information; staff's knowledge; consistent advice, long-range help; assistance in choosing right products; interest in personal life; professionalism of offices; Reliability; personal attention; comfort; features.
SERPERF model	Efficiency, timeliness, and security as contributors to the quality of port services
Model of perceived service quality and satisfaction (Ali et al., 2021)	Rational quality, result quality, and physical environmental quality as aspects of service quality.
The antecedents and mediator model (Garad et al., 2021)	Readily available information on port-related activities, port location, port turnaround time, facilities available, port management, port costs, and customer convenience.
Lopez and Poole (1998)	The five SERVQUAL dimensions.
Brady and Cronin (2001)	Resources, outcomes, process, management, and image and social responsibility.
Ha (2003)	Endogenous quality, exogenous quality, and relational quality.

Table 3. (*Continued*).

Research model	Dimensions/characteristics
Ugboma, Ibe, and Ogwude (2007)	Resources, outcomes, process, management, and image and social responsibility.
(Thai, 2015)	Technical quality; functional quality; image.
(Cho et al., 2010)	Reliability; responsiveness; competence; access; communication; courtesy; credibility; security; understanding; tangibles, Reliability; responsiveness; empathy; assurance; tangibles.
Yeo, Thai, and Roh (2015)	Reliability; responsiveness; empathy; assurance; tangibles; Convenience of making an appointment; staff's friendliness; staff listen to questions; staff provide accurate information; staff's knowledge; consistent advice, long-range help; assistance in choosing right products; interest in personal life; professionalism of offices; Reliability; personal attention; comfort; features.

Source: T D.N. Le, H.T. Nguyen and P. Hoang Truong (2019).

Table 3 showcases a selection of theoretical research models derived from prior studies. Upon examining these models, it's clear that each provides a unique perspective in measuring service quality. For this specific study, the authors have elected to utilize the SERVQUAL model as a foundation for analyzing the current service quality at the Salalah port. This choice facilitates the proposition of a solution to the logistics service quality issue at the Oman port. The dimensions of port service quality and service quality are outlined in **Table 3**.

Table 4 provides a summary of findings from past research on factors affecting service quality, as carried out by various researchers such as Parasuraman et al. (1988), Parasuraman, Berry, and Zeithaml (1990), Cronin and Taylor (1992), Dabholkar et al. (2000), Ugboma et al. (2004), Ugboma et al. (2007), Pantouvakis and Dimas (2013), and Vo and Nguyen (2012). These studies, undertaken with diverse characteristics and across various countries, have established a positive relationship between each dimension of service quality and overall service satisfaction.

Table 4. The synthesis studies result on factors of quality of service.

Factors\ Dimension	Author (year)	Sample	Findings	Characteristics
Empathy	Parasuraman et al. (1988), Parasuraman, Berry, and Zeithaml (1991)	The U.S.	Positive	TERRA
	Cronin and Taylor (1992)	The U.S.	Positive	The dimensions of service quality performance, as outlined by the TERRA model, each have a significant positive relationship with overall customer satisfaction. This, in turn, influences behavioral intentions.
	Dabholkar et al. (2000)	The U.S.	Positive	The researchers discovered that factors pertinent to service quality are more effectively conceptualized as its antecedents rather than its components, and that customer satisfaction acts as a potent mediator of the effect of service quality on behavioral intentions.
	Ugboma et al. (2004)	Nigeria	Positive	The validity of the TERRA model was confirmed.
	Ugboma, Ogwude, Ugboma, and Nnadi (2007)	Greece		The findings from their research support a more simplified three-dimensional single-measurement model, challenging the five-dimensional nature of the SERVQUAL instrument. Further elaboration on this follow.

Table 4. (*Continued*).

Factors\ Dimension	Author (year)	Sample	Findings	Characteristics
	Pantouvakis and Dimas (2013)	Vietnam	Not affecting	The findings of their research indicate that: (i) customer loyalty is influenced by four aspects of service quality (reliability, responsiveness, utility of the website, and tangibles) along with customer satisfaction; and (ii) customer satisfaction is impacted by five facets of service quality (reliability, responsiveness, utility of the website, tangibles, and empathy).
	Vo and Nguyen (2012)	Vietnam		The investigation further delineated seven dimensions contributing to customer satisfaction, which include: Tangibles, Reliability, Assurance, Empathy, Perceived Price, Relationship Service, and Relationship
	Parasuraman et al. (1988) Parasuraman et al. (1991)	The U.S.	Positive	Their conceptual model outlines five foundational dimensions of service quality, specifically: tangibles, reliability, responsiveness, assurance, and empathy.
	Cronin and Taylor (1992)	The U.S.	Positive	The findings suggest that the service quality performance dimensions, encapsulated by the TERRA model, are all significantly positively correlated with overall customer satisfaction, which subsequently influences behavioral intentions.
	Dabholkar et al. (2000)	The U.S.	Positive	Their research concludes that aspects pertinent to service quality are more suitably understood as antecedents, rather than as components. Additionally, they found that customer satisfaction has a strong mediating role in the influence of service quality on behavioral intentions.
	Ugboma et al. (2004)	Nigeria	Positive	TERRA were valid
	Pantouvakis and Dimas (2013)	Greece	Positive	The findings endorsed a more parsimonious three-dimensional single-measurement model, challenging the five-dimensional structure of the SERVQUAL instrument. Furthermore, it has been substantiated that agility partially mediates the reliability/responsiveness dimension.
Reliability	Vo and Nguyen (2012)	Vietnam	Positive	The results demonstrate that: (i) customer loyalty is influenced by four dimensions of service quality (reliability, responsiveness, website utility, and tangibles) as well as customer satisfaction; and (ii) customer satisfaction is affected by five dimensions of service quality (reliability, responsiveness, website utility, tangibles, and empathy).
	Vo and Nguyen (2012)	Vietnam	Positive	The research culminated in the identification of seven dimensions integral to customer satisfaction, namely: Tangibles, Reliability, Assurance, Empathy, Perceived Price, Relationship Service, and Relationship.
	Parasuraman et al. (1988) Parasuraman et al. (1991)	The U.S.	Positive	This framework offers five fundamental dimensions of service quality, which are: tangibles, reliability, responsiveness, assurance, and empathy.

Table 4. (*Continued*).

Factors\ Dimension	Author (year)	Sample	Findings	Characteristics
Assurance	Cronin and Taylor (1992)	The U.S.	Positive	The findings highlight that each dimension of service quality performance, as denoted by the TERRA model, is significantly positively correlated with overall customer satisfaction, which subsequently influences behavioral intentions.
	Ugboma et al. (2004), Ugboma et al. (2007)	Nigeria	Positive	TERRA were valid
	Pantouvakis and Dimas (2013)	Greece	Not affectin g	The findings back a more streamlined three-dimensional single-measurement model, thereby challenging the five-dimensional construct of the SERVQUAL instrument. Moreover, it was substantiated that agility mediates the reliability/responsiveness dimension to some extent.
	Pantouvakis and Dimas (2013)	Vietnam	Positive	The outcomes demonstrate that: (i) customer loyalty is influenced by four service quality dimensions (reliability, responsiveness, website utility, and tangibles) alongside customer satisfaction; and (ii) customer satisfaction is affected by five dimensions of service quality (reliability, responsiveness, website utility, tangibles, and empathy).
	Vo and Nguyen (2012)	Vietnam	Positive	The research unveiled seven dimensions constituting customer satisfaction: Tangibles, Reliability, Assurance, Empathy, Perceived Price, Relationship Service, and Relationship.
	Parasuraman et al. (1985) Parasuraman et al. (1988)	The U.S.	Positive	This model delineates five foundational dimensions of service quality, represented as TERRA.
Responsivene ss	Cronin and Taylor (1992)	The U.S.	Positive	The results suggest that each of the service quality performance dimensions, denoted as TERRA, has a significant and positive correlation with overall customer satisfaction, which consequently influences behavioral intentions.
	Ugboma et al. (2004), Ugboma et al. (2007)	Nigeria	Positive	TERRA were valid
	Pantouvakis and Dimas (2013)	Greece	Positive	These findings indicate that the service quality measurement model can be simplified into a three-dimensional model instead of the conventional five-dimensional SERVQUAL instrument. It also finds that agility has a partial mediating effect on the reliability/responsiveness dimension.
		Vietnam	Positive	The research demonstrated that: i) Customer loyalty is influenced by four dimensions of service quality, namely, reliability, responsiveness, website utility, and tangibles, along with customer satisfaction. ii) Customer satisfaction is affected by five dimensions of service quality: reliability, responsiveness, website utility, tangibles, and sympathy.
	Vo and Nguyen (2012)	Vietnam	Positive	the research found seven dimensions that contribute to customer satisfaction: Tangibles, Reliability, Assurance, Empathy, Perceived Price, Relationship Service, and Relationship.

Source: D.N. Le, H.T. Nguyen and P. Hoang Truong (2019).

3. Research methodology

3.1. Statistical analysis

The combination of qualitative and quantitative approaches provides a

comprehensive understanding of the subject matter. This is often referred to as a mixed methods approach. In this study, a total of 300 questionnaires were distributed to customers who are employees of businesses using Salalah port logistics services in Salalah city, Sultanate of Oman. The data collected was carefully reviewed both during and after the collection process. Variables that were not coded initially were given appropriate codes, and the data was then classified and tabulated for ease of analysis. The software used for data analysis was the Statistical Package for the Social Sciences (SPSS) version 25.0. SPSS is a powerful tool for managing and statistically analyzing data. Qualitative data, on the other hand, was analyzed through descriptive analysis, which involves interpreting and making sense of the data in terms of the themes and patterns that emerge. This method helps in understanding the experiences, behaviors, and perspectives of the respondents, adding a deeper context to the quantitative data. Together, these methods can provide a holistic view of customer perceptions and experiences with the Salalah port logistics services.

3.2. Research process

This research was conducted based on a combination of qualitative research and qualitative research. The entire research process was carried out and illustrated in the following steps (a) find out the research problem, (b) formulate the theoretical framework, research design the model of research (c) prior research, scale measurement modification and final research questionnaire, (d) Data collection survey, collected data results (e) synthesize and data analysis—Cronbach's Alpha, EFA, hypotheses testing, result and discussion to propose the implication of research. Conducting preliminary research using qualitative methods is an effective way to explore a problem or phenomenon in depth. In this case, you employed group discussion techniques with research members who had a focused understanding of the subject matter. This was combined with your synthesis of relevant theories, studies, models, and scales that measure service quality and customer satisfaction. To begin, you synthesized and adopted scales from previous research, then translated and modified the wording to suit your specific study context, thereby creating a draft questionnaire. To ensure the validity of your questionnaire and its relevance to the industry, you approached ten people who worked in logistics and had at least two years of maritime and logistics experience. Their insights were used to adjust observational variables and customize the questionnaire, thereby shaping the measurement scale for your study. Conducting your preliminary study in Salalah City, Oman in May 2021, also provided contextual relevance to your research. The insights gained from the qualitative phase can help you in the next steps of your research, ensuring your study is grounded in real-world experience and is relevant to the professionals in the field.

In the future, if resources and time permit, you could consider expanding your research techniques to include other qualitative methods such as individual interviews or observations, which may provide additional insights. The research questionnaire was distributed with 300 customers who are using logistics services at Salalah Port by a completed questionnaire. Field staff working for businesses that use international port logistics services at the Port of Salalah served as questionnaire

respondents. They are company representatives who directly use logistics services at the Port of Salalah and carry out customs procedures for shipments. Therefore, the perception and level of their satisfaction with the logistics services of the Port of Salalah also reflects the perception and level of satisfaction of their company. This data collection was carried out in the City of Salalah in December 2021.

3.3. Proposed research model

We propose the model from the SERVQUAL framework, to identify the key factors influencing service quality. Our aim is to evaluate customer satisfaction regarding the logistics services provided by Salalah Port. This model will serve as a lens to examine and measure the following aspects as shown in **Figure 3**.

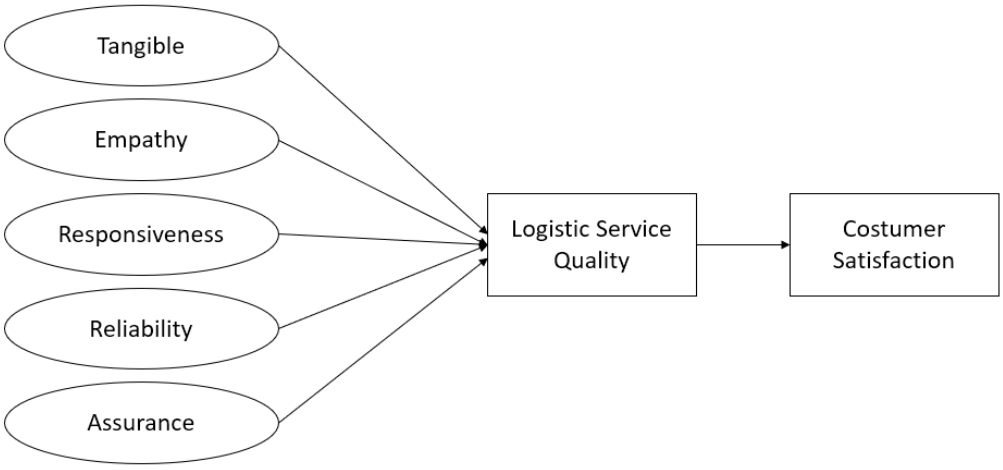

Figure 3. Propose the study model.

3.4. Research hypotheses

Based on the proposed model, we expect there are positive impact of Salalah Port logistic Service quality dimension- tangible, empathy, reliability, responsiveness, assurance (TERRA) on Salalah Port customer satisfaction, therefore we arrange the hypotheses as follows:

H1: Tangibles has a positive impact on Salalah Port Logistics Service Quality.

H2: Empathy has a positive impact on Salalah Port Logistics Service Quality.

H3: Reliability has a positive impact on Salalah Port Logistics Service Quality.

H4: Responsiveness has a positive impact on Salalah Port Logistics Service Quality.

H5: Assurance has a positive impact on Salalah Port Logistics Service Quality.

H6: Salalah Port Logistics Service Quality has a positive impact on Salah Port customer satisfaction.

3.5. Sampling method, sample size and scales of measurement

The sample for this research was selected using the convenience sampling method, considering the constraints of time, budget, and available resources. 300 customers were able to participate in the survey. Random sampling technique was

adopted to select customers who are repeatedly visiting Salalah port. In order to ensure practicality, the non-probability convenience sampling method was chosen. The survey questionnaire used in the study consisted of 26 observational variables related to service quality (as shown in **Table 5**), along with four observational variables pertaining to customer satisfaction. The minimum sample size required to ensure representativeness and accuracy of the research was determined to be 150 valid survey responses, calculated based on the formula $n \geq 5 \times 30$. However, to enhance the representation and accuracy of the study, approximately 300 samples were collected. The measurement scale utilized in this study was adopted from previous literature and has been presented. Notably, the tangible construct included technology-based items, aiming to explore the impact of technology on port logistics service quality and customer satisfaction.

Table 5. Scale measurement.

NO	Variables	Item questionary
	Tangibles	
1	TA-1	Salalah Port has modern and advanced machinery and equipment.
2	TA-2	The working offices at Salalah Port are spacious, creating trust for you.
3	TA-3	The staff members of Salalah Port are well-dressed and wear neat uniforms.
4	TA-4	Machinery and equipment of Salalah Port (forklifts, warehouses, cranes, piers, etc.) always meet the requirements of providing logistics services.
	Empathy	
5	EMP1	The staff members of Salalah Port express interest to each customer like you.
6	EMP2	The staff members of Salalah Port know how to care about your logistics services' needs.
7	EMP3	The staff members of Salalah Port understand your special needs related to the transportation of cargoes (warehousing, storage, handling, inspection, etc.).
8	EMP4	Salalah Port pays attention to the issues that you are most concerned about (cut-off time, clearance time, container position, etc.).
9	EMP5	The working hour of Salalah Port makes it convenient to serve your needs.
	Reliability	
10	REL1	Salalah Port always performs logistics services which are committed (cargo clearance, loading and unloading containers, inspection, etc.).
11	REL2	When you encounter services problems (handling, storage, transportation, inspection, fumigation, etc.) at the port, Salalah Port proves genuine concern for addressing the problems.
12	REL3	Logistics services of Salalah Port are stable and reliable.
13	REL4	Salalah Port provides the right services at right time as committed.
14	REL5	In the process of providing logistics services, Salalah port does not make any significant mistakes.
	Responsiveness	
15	RES1	Salalah Port always informs customers about the time its services are provided to customers.
16	RES2	The staff members of Salalah Port quickly perform logistics services for you (customs clearance, inspection support...).
17	RES3	The staff members of Salalah Port are always available at your requests when your cargoes face troubles at port.
18	RES4	The staff members of Salalah Port are never too busy to respond to your requests.

Table 5. (*Continued*).

NO	Variables	Item questionary
	Assurance	
19	ASS1	The behaviors of staff members of Salalah Port create confidence for you.
20	ASS2	You feel secure while using the logistics services of Salalah Port.
21	ASS3	The staff members of Salalah Port are always polite and courteous to you.
22	ASS4	The staff members of Salalah Port have sufficient expertise to answer your questions about logistics services.
	Overall service quality	
23	AOSQ1	Overall, quality of logistics services provided by Salalah Port is superior to those of other ports in Salalah City and neighboring areas (Sohar port, Duqm port, Muscat port, etc).
24	AOSQ2	There are some types of logistics services provided by Salalah Port which have the quality better than those of other ports in Salalah City and neighboring areas (Sohar port, Duqm port, Muscat port, etc.).
25	AOSQ3	Overall, the quality of logistics services provided by Salalah Port is of high standards in port logistics industry.
26	AOSQ4	Overall, the quality of logistics services provided by Salalah Port meets your expectations of service quality.
	Customer satisfaction	
27	CUSSAT1	Overall, you are satisfied when using logistics services of Salalah Port.
28	CUSSAT2	You are satisfied with manners and methods that Salalah Port has organized and managed to provide logistics services.
29	CUSSAT3	You are satisfied with the services provided by and working attitudes of the staff members of Salalah Port.
30	CUSSAT4	You are satisfied with the process of cargo management and cargo customs clearance procedures of Salalah Port.

Source: D.N. Le, H.T. Nguyen and P. Hoang Truong (2019).

4. Research results

4.1. Sample profile

The significant representation of field staff in the sample indicates that front-line executives play a crucial role in perceiving the port logistics service. Furthermore, a substantial portion of the respondents come from the service sector, aligning with the prevalence of forwarding enterprises in Oman who are regular customers of port logistics services. This suggests that the sample composition accurately reflects the relevant stakeholders involved in the service delivery process. **Table 6** shows the demographics of respondents.

Table 6. Respondent's profiles.

Statement	Category	Frequency	Percentage (%)
Types of business	Service company	98	33
	Trading company	100	33
	Manufacturing company	102	34
Frequency of service usage	1–2 time/month	60	20
	3–4 times/month	90	30
	Over 5 times/month	150	50

Table 6. (*Continued*).

Statement	Category	Frequency	Percentage (%)
Current position	Field staff	125	70
	Manager	90	30
	others	85	28
Years with current position	1–2 years	140	47
	3–4 years	75	25
	Over 4 years	85	33

Source: Survey result.

4.2. Validity and reliability results

The results of the completed questionnaires demonstrated that the Kaiser, Meyer-Olkin (KMO) measure of sampling adequacy supported the application of factor analysis. The KMO measure indicated that the proportions of variance in the variables are influenced by underlying factors. Additionally, Barlett's Test of Sphericity yielded a significant value of 0.000 (less than 0.05), further confirming the suitability of the analysis. The factor loadings for the variables were as follows: Tangible (0.944), Empathy (0.940), Reliability (0.972), Responsiveness (0.902), Assurance (0.983), and Overall Service Quality (0.901). These factor loadings, all above 0.7, indicate a strong correlation between the variables and their respective factors. The significant value obtained from Barlett's Test of Sphericity, which is less than 0.05, indicates that the sample size is appropriate and the data is suitable for factor analysis. **Table 7** illustrates the Kaiser-Meyer-Olkin and Barlett's test.

Table 7. Kaiser-Meyer-Olkin and Barlett's test.

Factor	KMO of sampling	Barlett's test of sphericity		
		Approximate chi-square	df	sig
Tangible	0.944	1886.632	253	0.000
Empathy	0.940	797.944	21	0.000
Reliability	0.972	1302.494	55	0.000
Responsiveness	0.902	632.647	21	0.000
Assurance	0.983	1311.625	171	0.000
Overall Service Quality	0.901	1464.811	120	0.000
Customer Satisfaction	0.921	1212.522	125	0.000

Source: Survey results.

After conducting factor analysis on the SERVQUAL dimensions, the researcher identified five distinct factors based on the 26 questions. These factors include Tangible (four questions), Empathy (five questions), Reliability (five questions), Responsiveness (four questions), and Assurance (four questions). Each question showed a loading variance component higher than 0.5, indicating a strong relationship with its respective factor.

The Cronbach's α scores for each factor were as follows: Tangible (0.926), Empathy (0.936), Reliability (0.917), Responsiveness (0.925), Assurance (0.908), Overall Service Quality (0.993) and Customer Satisfaction (0.933). These scores

demonstrate good reliability for the individual factors and are consistent with the internal consistency of the constructs. Furthermore, the Cronbach's α was calculated for the entire questionnaire and was found to be above 0.7, indicating a high level of internal consistency and validity of the constructs employed (Hair et al., 2010; Fornell & Larcker, 1981). For a more detailed overview, please refer to **Table 8**.

Table 8. Summary of factor analysis for SERQUAL.

Factor	Items	Factor loading	Cronbach's α
Tangible	TA-1	0.756	0.926
	TA-2	0.796	
	TA-3	0.629	
	TA-4	0.705	
Empathy	EMP1	0.879	0.936
	EMP2	0.931	
	EMP3	0.839	
	EMP4	0.971	
	EMP5	0.932	
Reliability	REL1	0.806	0.917
	REL2	0.863	
	REL3	0.851	
	REL4	0.833	
	REL5	0.990	
Responsiveness	RES1	0.853	0.925
	RES2	0.887	
	RES3	0.865	
	RES4	0.901	
Assurance	ASS1	0.829	0.908
	ASS2	0.882	
	ASS3	0.909	
	ASS4	0.805	
Overall Quality Service	AOSQ1	0.673	0.993
	AOSQ2	0.765	
	AOSQ3	0.778	
	AOSQ4	0.787	
Customer Satisfaction	CUSSAT1	0.673	0.933
	CUSSAT2	0.779	
	CUSSAT3	0.777	
	CUSSAT4	0.771	

Source: Survey result correlation result.

4.3. Research correlation

Table 9 shows the correlation of all TERRA dimension and Overall service quality was significant. which means that TERRA dimension has the ability to increase overall service quality.

Table 9. Correlations between TERRA and QS.

TA			EMP	REL	RES	ASS	QS
	Pearson Correlation	1					
TA	Sig. (2-tailed)						
	N	300					
	Pearson Correlation	0.998**	1				
EMP	Sig. (2-tailed)	0.000					
	N	300	300				
	Pearson Correlation	0.987**	0.989**	1			
REL	Sig. (2-tailed)	0.000	0.000				
	N	300	300	300			
	Pearson Correlation	0.941**	0.943**	0.952**	1		
RES	Sig. (2-tailed)	0.000	0.000	0.000			
	N	300	300	300	300		
	Pearson Correlation	0.941**	0.943**	0.952**	1.000**	1	
ASS	Sig. (2-tailed)	0.000	0.000	0.000	0.000		
	N	300	300	300	300	300	
	Pearson Correlation	0.939**	0.940**	0.926**	0.907**	0.907**	1
QS	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	
	N	300	300	300	300	300	300

****.** Correlation is significant at the 0.01 level (2-tailed); Source: Survey result.

4.4. Result of research hypotheses

Table 10 measured the hypothesis 1–5 (H_1–H_5), the regression analysis was examined to determine the proportion of Salalah Port Logistics Service Quality which would be predicted by TERRA dimension. The linear regression model was found to be statistically significant with *p* value = 0.000. Therefore, TERRA dimensions were a significant predictor of Salalah Port Logistics Service Quality because p is less than 5%.

Table 10. Regression results of SERVQUAL dimension and Salalah port logistics service quality.

Model	*R*	*R* Square		Adjusted *R* Square		Std. Error of the estimate	Decision
1	0.866[a]	0.749		0.738		3.229	
ANOVA							
		Sum of square	df	Mean square	*F*	Sig.	
	Regression	2806.376	4	701.594	67.302	0.000[b]	
	Residual	938.213	90	10.425			
	Total	3744.589	94				

Table 10. (*Continued*).

Model	***R***	***R* Square**	**Adjusted *R* Square**		**Std. Error of the estimate**		**Decision**
Coefficients							
		Unstandardised B	Coefficients Std. Error	Standardised Coefficients Beta	*T*	Sig	
	Constant	1.456	2.617		0.557	0.579	
	Tangible	0.500	0.123	0.438	4.063	0.000	H1: Accepted
	Empathy	0.346	0.138	0.303	2.498	0.014	H2: Accepted
	Reliability	0.550	0.232	0.344	2.367	0.020	H3: Accepted
	Responsiveness	0.535	0.138	0.414	3.872	0.000	H4: Accepted
	Assurance	0.525	0.124	0.311	2.427	0.011	H5: Accepted

DV: Customer satisfaction; Predictors: (Constant) TERRA; Source: Survey result.

5. Discussion

Results of this research revealed that quality service including five dimensions TERRA have positive and significant impact on customer satisfaction. these results are in line with previous work where these studies have confirmed the positive impact of TERRA on customer satisfaction (Al-Ansi et al., 2015; Jaboob et al., 2024; Taderera et al., 2018). Furthermore, logistic service quality was tested one more time on customer satisfaction as shown in **Table 10**, where LSQ has positive and significant impact on customer satisfaction. the results highlighted the role of quality service in enhancing customer satisfaction and loyalty. Prior research indicates that service quality is a direct contributor to customer satisfaction and, consequently, customer loyalty. The SERVQUAL framework, developed in 1982, identifies five dimensions of service quality—tangibles, reliability, responsiveness, assurance, and empathy—that contribute to customer satisfaction. Improving these dimensions helps organizations meet customer expectations and increases customer satisfaction, leading to enhanced loyalty and retention.

A study conducted at Restaurant XYZ found that response accuracy, product uniqueness, and employee attention made customers happier and led them to return more frequently (Al-Ansi et al., 2023). Similarly, a study focusing on the Saudi Arabian auto care industry showed that reliability, empathy, responsiveness, assurance, and tangibility were positively associated with customer satisfaction [53,38]. Overall, maintaining high levels of service quality contributes to increased customer satisfaction, which in turn fosters customer loyalty and drives organizational success.

In addition, logistic service quality plays a crucial role in determining customer satisfaction levels within any organization, as it directly impacts the overall customer experience. From the accuracy and timeliness of deliveries to the efficiency of handling returns and exchanges, customers rely on these logistics services to ensure smooth and seamless transactions (Al-Ansi et al., 2015; Cimino et al., 2016). High-quality logistics services not only enhance customer satisfaction but also build trust and loyalty towards the company. Customers expect their orders to be delivered promptly, undamaged, and with accurate tracking information. Any lapses in logistic service quality can result in delayed shipments, lost packages, or damaged goods–all

of which can lead to frustrated customers and a decline in satisfaction levels [44]. Therefore, investing in top-notch logistics services is essential for meeting customer expectations and maintaining high levels of satisfaction within a competitive market environment.

6. Conclusion

The aim of this research was to investigate the effect of Salalah port service quality on customer satisfaction. A multivariate of regression model was built to test the research hypotheses. Data was collected from 300 selected customer who use the Salalah port service. The finding showed that TERRA were a significant predictor of Port Salalah service quality and Salalah port service quality has a significant effect on Salalah Port customer satisfaction. The results reveal significant correlation between service quality and customer satisfaction as well. These results give important evidence from Arab region regarding the quality of service and satisfaction of customers and highlight the role of Quality service in Salalah port in Sultanate of Oman. These results also have significant implications and usage for the manager at Salalah port and also these results could be used in investigation of different ports in the region.

7. Future research

Future research on logistic service quality and customer satisfaction should focus on the development and implementation of innovative technologies in the supply chain management process. With the rise of e-commerce and global trade, businesses are increasingly relying on logistics services to ensure efficient delivery of goods to customers. As such, researchers may explore how artificial intelligence, blockchain technology, and automation can be utilized to optimize logistics operations and enhance customer satisfaction. Additionally, there may be a greater emphasis on sustainability practices within the logistics industry, as consumers become more conscious of environmental issues. By investigating these areas further, researchers can contribute valuable insights that will help companies improve their service quality, meet customer expectations, and gain a competitive edge in the marketplace.

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