Annals of Human Resource Management Research (AHRMR)
ISSN: 2774-8561, Vol 5, No 4, 2025, 215-230 https://doi.org/10.35912/ahrmr.v5i4.3410

The mediating role of crew health in service quality

Joanna Gabriella[1], Edhie Budi Setiawan[2*], Theresye Yoanyta Octora[3], Amrulloh Ibnu Kholdun[4], Lira Agusinta[5]
Trisakti Institute of Transportation and Logistics, Jakarta, Indonesia[1,2,3,4,5]
gbriellaj@gmail.com[1] , edhie.budi@gmail.com[2*], yoanita.oct@gmail.com[3] , ibnu.10@gmail.com[4], lir4agusinta@gmail.com[5]

Article History
Received on 02 September 2025
1st Revision on 24 September 2025
2nd Revision on 14 October 2025
Accepted on 20 November 2025

Abstract
Purpose: This study examines the relationship between ship chandler service quality (specifically responsiveness, reliability, and product quality) and crew satisfaction, with crew health as a mediating variable. The research highlights the critical role of ship chandler services in supporting crew well-being, especially when access to essential supplies was restricted.
Research Methodology: This quantitative study surveyed 150 crew members from 52 PIS-owned vessels using PMSol services, selected through purposive sampling, and analyzed the data using Partial Least Squares Structural Equation Modeling (PLS-SEM).
Results: The findings reveal that crew satisfaction is significantly influenced by responsiveness, reliability, and product quality. Moreover, crew health acts as a mediating variable, strengthening the impact of service and product quality on satisfaction. High-quality, reliable, and responsive services (both directly and indirectly) enhance crew happiness and well-being.
Conclusions: Ship chandler services that are responsive, reliable, and provide high-quality products not only meet logistical needs but also enhance crew well-being and satisfaction. Recognizing crew health as a key factor can help maritime service providers design more human-centered support systems, especially during challenging times like a pandemic.
Limitations: The study focuses solely on crew members aboard PIS-owned vessels using PMSol services, which may limit the generalizability of the findings to other companies or contexts.
Contribution: Study highlights crew health as key mediator, linking service quality to satisfaction in maritime services.

Keywords: *Crew Satisfaction, Maritime Logistics, Product Quality, Reliability, Ship Chandler Services*

How to Cite: Gabriella, J., Setiawan, E. B., Octora, T. Y., Kholdun, A. I., & Agusinta, L. (2025). The mediating role of crew health in service quality. *Annals of Human Resource Management Research,* 5(4), 215-230.

1. Introduction

Service is an effort to meet the needs of others, whereas serving means helping to prepare or manage what someone requires. In an organizational context, service is a key indicator of successful implementation and performance measurement through bureaucracy (Dewi & Suparno, 2022). In maritime logistics, supply services are delivered based on requests from ships to supply companies or ship chandlers, which deliver necessities such as vegetables, fruits, spare parts, paint, and other needs. Ship chandler services are essential to ensure that food and other supplies on board are adequate, which helps ensure smooth ship operations. Despite the health and safety benefits associated with working on board ships, sailors remain vulnerable to accidents and illnesses. This vulnerability arises from work culture, climate change, personal habits, and other factors (Chin, 1998).

Food is a crucial part of a sailor's life because those working on cargo ships often undertake long voyages, resulting in limited access to fresh food and difficulty in controlling their diet (Baum-Talmor & Şahin, 2024). It regulates global maritime employment, covering welfare issues of sailors, from contract structuring to standards of accommodation and nutrition. Crew members living at sea in confined environments for extended periods face physical and mental challenges that can impact their health (Lau & Yip, 2017). Prolonged sea journeys may weaken the immune system, leading to various health (Lu et al., 2010; Myznikov, Makhrov, & Val'skiĭ, 2000; Protasov, Slezinger, & Antiukhova, 1996).

In the past decade, the maritime industry has paid increasing attention to monitoring food quality and catering services for crew members onboard. These issues are regulated by the International Labour Organization Food and Catering (Ship Crew) Convention of 1946 (No. 68) and the Ship Cook Certification Convention of 1946 (No. 69), which were amended in 2006 in Geneva. The Ship Cook Training Guidelines ILO (2014) emphasize three main principles: providing nutrition that meets established standards, quality, and variety, based on crew size. Catering staff must be well trained to ensure food safety and quality, which practical guidelines also aim to facilitate through national laws and regulations.

Health is increasingly viewed as "a resource for living," enabling individuals to function and participate actively in society (McCartney, Popham, McMaster, & Cumbers, 2019). Occupational health is defined as the physical, mental, and social well-being that enables workers to perform their tasks safely and productively without harming themselves, their families, society, or the environment. Health status is unique to each individual and forms the foundation for social participation and the overall welfare. Therefore, the state’s primary responsibility should be to enhance health and address disparities caused by unequal resource distribution (Thomson, 2022).

PT Pertamina Marine Solutions (PMSol) began providing supply services (ship chandlers) in 2020. This service was performed at the request of 52 ships owned by PT Pertamina International Shipping (PIS). The motivation behind this study stems from several issues. Conflict of interest arises when there is a close relationship between authorities and entrepreneurs (Chandranegara & Cahyawati, 2023). According to Duflo in Chirikov (2023), evaluations that involve payments between companies or individuals can create conflicts of interest, possibly leading to biased results. In this case, providing supply services is an effort to reduce potential conflicts of interest, particularly the temptation for the crew to shop for necessities outside the vessel, which could involve vendors or local suppliers.

Identifying another issue, conflict of identity occurs when sub-identities related to ethnicity, race, or religion are merged or contrasted, potentially causing discord among the group members. This is especially relevant in Indonesia, a diverse nation with various cultures, ethnicities, and religions. Differences between crew members and local communities encountered onboard or ashore can trigger conflicts, especially over diverse needs and sensitivities (Eslamdoost, King, & Tajeddin, 2020; Suherman & Sirajuddin, 2018). Maintaining focus performance is vital for driving safety. Ship supply services aim to ensure that crew members can concentrate on their operational tasks, navigation, engine maintenance, and cargo supervision without being distracted by non-operational issues such as procurement or logistics. When these needs are met effectively, human error risks decrease, enhancing safety (Bauweraerts, Arzubiaga, & Diaz-Moriana, 2022). Crew members must maintain high focus and work discipline, which is supported by reliable supply services that provide appropriate nourishment, health supplies, and other essentials to the crew.

Workplace safety is a critical concern, especially in high-risk industries such as oil and gas. Occupational accidents often result from unsafe actions and conditions. Human errors such as negligence and failure in skills or knowledge are common causes of incidents (Jamil, Mallapiang, & Multazam, 2023). Unsafe conditions, such as a lack of safety gear or inadequate supplies, can also cause accidents, emphasizing the importance of ensuring that supply services deliver safe and quality goods. The International Maritime Organization (IMO) highlights that every crew member should have access to safe, sufficient, and culturally appropriate food and water, as stipulated by the Maritime Labor

Convention 2006. Insufficient nutrition and poor supply quality are linked to decreased crew health, fatigue, and lower operational performance (Primadianto, Putri, & Alifen, 2018).

Research indicates that nearly 77% of crew members have limited safety and health knowledge, which increases the risk factors onboard. The effective supply of healthy and nutritious food directly supports crew health and safety, thereby enhancing overall job satisfaction. Conversely, inadequate or substandard supplies can lead to dissatisfaction, malnutrition, or internal conflicts, which in turn diminish productivity and increase the risk of accidents.

Although prior studies have addressed occupational health, catering standards, and the welfare of seafarers, limited research has explicitly examined how the dimensions of ship chandler service quality responsiveness, reliability, and product quality affect crew satisfaction through health as a mediating factor. Most existing literature focuses on regulations, nutrition, or general occupational safety but does not integrate logistics service performance with human-centered outcomes in maritime settings. Moreover, in the Indonesian context, empirical studies exploring ship chandler services as determinants of crew health and satisfaction remain scarce. This creates an important research gap that this study aims to fill.

This study aims to analyze how service quality, specifically reliability, responsiveness, and product quality, affects crew satisfaction through health as an intervening variable. This includes examining how the effectiveness of supply services from PMSol impacts the health and overall satisfaction of crew members aboard the ships under PIS. This study is structured into several distinct sections to ensure a comprehensive exploration of the research topic.

The first section serves as an introduction, providing the necessary background and contextual foundation for this study. The second section presents a literature review, examining prior research and conceptual frameworks to establish the academic groundwork. The third section outlines the details of the research methodology, including the research design or approach, respondents' details, and an explanation of operational variables for research findings and analysis. Subsequently, the fourth section presents the processed research findings, offering data-driven insights and interpretations. Finally, the fifth section concludes the study by summarizing the key outcomes, providing actionable recommendations, and discussing the potential policy implications derived from the research. This structured approach ensured clarity, coherence, and academic rigor throughout the study.

2. Literature review

2.1. Related Works

Previous studies across industries have consistently highlighted the importance of service and product quality as drivers of customer satisfaction and loyalty. For instance, Chaerudin and Syafarudin (2021) demonstrated that product quality, service quality, and price significantly shape purchase decisions and satisfaction in the medical equipment industry, with service and price exerting stronger influences than product quality. Similarly, Taufik, Santoso, Fahmi, Restuanto, and Yamin (2022) emphasized that product quality directly impacts satisfaction, whereas service quality works indirectly through perception, which subsequently drives customer loyalty. These findings suggest that the relative strength of product versus service quality may vary across contexts, but both are indispensable for building customer satisfaction and loyalty.

Grace, Girsang, Simatupang, Candra, and Sidabutar (2021); Syafarudin (2021) confirmed these dynamics in the automotive and banking sectors, respectively, showing that product quality reinforces trust and satisfaction, while satisfaction mediates loyalty outcomes. However, whereas Grace et al. (2021) focused on consumer markets where tangible product excellence dominates, Syafarudin (2021) highlighted digital service quality as a crucial determinant during the COVID-19 pandemic. This contrast shows how sectoral contingencies shape the role of quality, yet both confirm that satisfaction is the central mediating mechanism.

Studies in hospitality and insurance contexts, such as Mahsyar and Surapati (2020) and Chege (2021), further nuance these findings. In restaurants, product quality had a stronger effect than service quality, reflecting the primacy of tangible outcomes (e.g., freshness, taste, and presentation). Conversely, in the insurance sector, service reliability emerged as the most critical factor in ensuring satisfaction, underscoring that intangible trust and consistency matter more than price or product features. This divergence illustrates that while quality dimensions are universal, their salience is context dependent.

Recent service quality research has also emphasized multidimensional constructs. Herudiansyah, Fitantina, and Suandini (2023); Shukri, Yajid, and Tham (2020) found responsiveness, reliability, and assurance to be significant in shaping satisfaction in healthcare contexts. Their study highlights that improvements in multiple service dimensions collectively foster trust and satisfaction. Moreover, Kim and Chang (2020) introduced a technological perspective by analyzing chatbot services, showing that process quality and perceived reliability drive reuse intentions, suggesting that digital service platforms also follow similar quality-satisfaction mechanisms.

Although the existing literature provides robust evidence that service quality, product quality, and reliability drive satisfaction across industries, several gaps remain. First, much of the research is sector-specific (healthcare, banking, insurance, restaurants) and does not account for industries where logistics and human well-being are closely interlinked. Second, most studies treat satisfaction as a direct outcome but overlook its interaction with mediating factors such as health and safety, which are critical variables in high-risk, labor-intensive environments such as maritime logistics. Third, while responsiveness, reliability, and product quality have been validated in the consumer and service industries, their role in the maritime sector, particularly in ship chandler services, remains underexplored.

Unlike traditional industries, maritime logistics introduce unique complexities, such as delayed port access, perishable goods handling, and prolonged crew isolation. In such contexts, service quality is not merely about satisfaction; it directly affects crew health, safety, and operational performance. Although prior maritime studies Lau and Yip (2017); Vu (2021) acknowledge the importance of welfare and supply quality, they lack an integrated framework linking service quality → health → satisfaction. This underlines the novelty of the present study, which critically investigates how reliability, responsiveness, and product quality influence crew satisfaction with health as a mediating factor, focusing on PT Pertamina Marine Solutions (PMSol) as a case study.

2.2. Conceptual Framework

Based on previous research and a literature review, this study proposes a novel conceptual framework integrating reliability (X1), responsiveness (X2), Product Quality (X3), Crew Health (Z), and Crew Satisfaction (Y) in the context of ship chandler services at PT Pertamina Marine Solution. Based on prior research and theoretical foundations, the following hypotheses were formulated:

H1: Reliability (X1) positively influences Crew Health (Z).
H2: Responsiveness (X2) positively influences Crew Health (Z).
H3: Product Quality (X3) positively influences Crew Health (Z).
H4: Reliability (X1) positively influences Crew Satisfaction (Y).
H5: Responsiveness (X2) positively influences Crew Satisfaction (Y).
H6: Product Quality (X3) positively influences Crew Satisfaction (Y).
H7: Crew Health (Z) positively influences Crew Satisfaction (Y).
H8: Reliability (X1) positively influences Crew Satisfaction (Y) through the mediation of Crew Health (Z).
H9: Responsiveness (X2) positively influences Crew Satisfaction (Y) through the mediation of Crew Health (Z).
H10: Product Quality (X3) positively influences Crew Satisfaction (Y) through the mediation of Crew Health (Z).

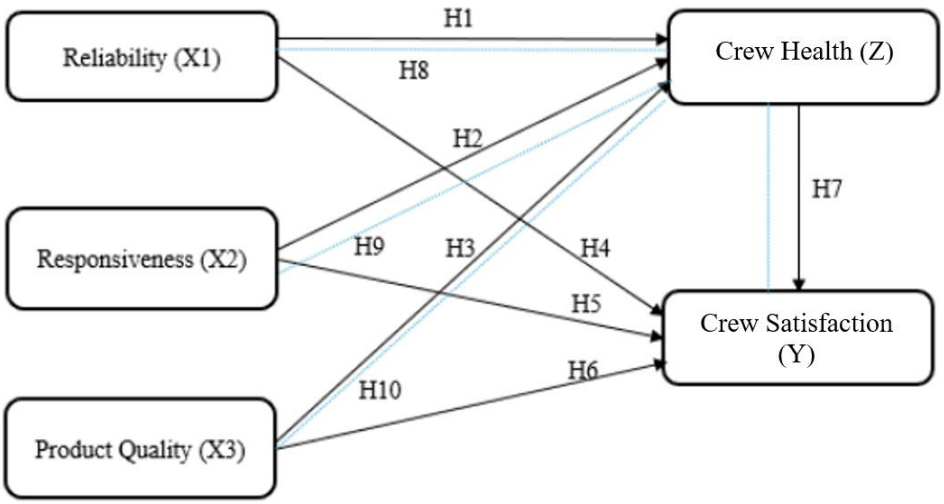

Figure 1. A Conceptual Framework

This framework synthesizes key insights from service quality literature P. T. Kotler and Armstrong (2020); Parasuraman, Zeithaml, and Berry (1988) and extends prior work on maritime logistics Lau and Yip (2017); Vu (2021) by empirically examining the mediating role of Crew Health between service attributes and satisfaction. By emphasizing the human-centric dimension of ship chandler services where crew well-being directly impacts operational performance, this study aligns with recent calls for integrating health and safety into maritime supply chain management (Mary, Sharma, Malviya, Hamida, & Zala, 2023).

The model also addresses sector-specific challenges, such as the criticality of a timely and nutritious food supply for seafarers, while bridging theoretical gaps in understanding how Reliability, Responsiveness, and Product Quality collectively enhance satisfaction through health outcomes (Gu et al., 2020). Methodologically, it builds on the Service Quality (SERVQUAL) framework but adapts it to the unique constraints of maritime logistics, where service delays or quality lapses can directly compromise crew productivity and their morale.

By focusing on PMSol, this study offers practical insights for an industry undergoing rapid modernization, highlighting how digitalization (e.g., real-time inventory tracking) and governance (e.g., ISO 9000 compliance) can synergize with traditional service quality metrics to optimize crew satisfaction. Ultimately, this study contributes to both academic discourse and managerial practice by demonstrating that investing in crew health is not only an ethical imperative but also a strategic lever for business performance.

3. Methodology

3.1. Research Design

This study adopts a quantitative research approach, adapted from previous studies, which focuses on numerical data collection and statistical analysis to examine the relationships among variables. Quantitative research involves gathering numerical data from a representative sample of the target population and applying statistical techniques to identify patterns and causal relationships (Murjani, 2022). This method allows broader generalizations about the population based on empirical data collected from a sufficiently large and representative sample. The study was conducted at PT Pertamina Marine Solutions (PMSol), located on Jalan Yos Sudarso No. 32, Jakarta Utara. Data were collected using an online survey (Google Forms) distributed to ship crew members who received ship chandler services. A cross-sectional approach was employed, where data were gathered at a single point in time (within a span of days, weeks, or months) to obtain the responses needed for hypothesis testing.

The selection of a quantitative approach and PLS-SEM is strongly justified by the study objectives. Quantitative methods are particularly suitable for testing complex causal relationships among multiple

latent variables, allowing rigorous hypothesis testing and generalization of results. The use of PLS-SEM offers advantages in predictive accuracy, tolerance for small-to-moderate sample sizes, and the ability to analyze mediating variables within a single framework, making it well-suited for the maritime logistics context, where access to respondents is limited. However, the cross-sectional design presents limitations because it captures data only at one point in time. This restricts the ability to establish long-term causal inferences or account for dynamic changes in crew health and satisfaction across voyages. Future studies should employ longitudinal or mixed-method approaches to strengthen causal interpretations and provide deeper insights into temporal variations in crew experiences.

3.2. Variable Operationalization

This study employs a quantitative research design incorporating three independent variables (Reliability, Responsiveness, and Product Quality), one dependent variable (crew satisfaction), and one mediating variable (crew health). Data collection was conducted through closed-ended questionnaires, in which respondents were presented with predefined answer choices to ensure standardized responses. The questionnaire items were carefully developed based on established theoretical frameworks (Afroj et al. (2021), with each variable operationalized through specific dimensions and indicators.

Reliability (X1) refers to a ship chandler company's ability to provide consistent, timely, and promised services (Afroj et al., 2021). This construction is measured using three indicators: X1-1 assesses the company's dependability in fulfilling requests (consistency), X1-2 evaluates problem-solving effectiveness (problem resolution), and X1-3 measures service delivery speed (service speed). These indicators capture different aspects of reliability using Likert scale measurements of dependability level, responsiveness rate, and service timeliness.

Responsiveness (X2) represents a company's willingness to promptly and effectively assist crew members and address their needs (Afroj et al., 2021). The construction comprises three dimensions: X2-1 examines service readiness (service availability), X2-2 assesses complaint-handling efficiency (complaint resolution), and X2-3 evaluates regular facility maintenance checks (facility maintenance). These indicators measure different aspects of service responsiveness through availability ratings, satisfaction levels, and inspection frequency scales.

Product Quality (X3) reflects the quality of provisions (food supplies, equipment) provided by the ship chandler (Nes, Antonioli, Di Marcantonio, & Ciaian, 2024). This variable includes three measurement items: X3-1 evaluates the completeness of provision (facility completeness), X3-2 assesses product quality standards (product standard), and X3-3 examines hygiene levels (hygiene condition). The indicators utilize measurement scales for availability, quality rating, and hygiene standards to comprehensively evaluate product quality.

Crew Health (Z) indicates the physical health condition of ship crew members influenced by the ship chandler service and product quality. The construction is operationalized through two key health aspects: Z1 measures the nutritional quality of food provisions (nutritional value), and Z2 evaluates food hygiene standards (Hygiene Standard). These indicators assess health impacts using nutritional levels and cleanliness rating scales, reflecting how service and product quality contribute to crew well-being.

Crew Satisfaction (Y) represents crew members' overall satisfaction with ship chandler services. This dependent variable is measured through multiple satisfaction dimensions linked to reliability, responsiveness, and product quality. Satisfaction evaluation incorporates crew ratings of service performance and overall experience, providing a comprehensive assessment of how service attributes ultimately influence satisfaction levels.

Each variable was carefully operationalized based on established conceptual frameworks, with indicators specifically designed to capture the unique aspects of ship chandlering services in maritime contexts. The measurement scales were developed considering both theoretical relevance and practical

applicability in field settings, ensuring robust construct validity and reliability for empirical testing of the hypotheses.

3.3. Respondents

The respondents for this study comprised all ship crew members receiving ship chandler services from PMSol. In determining the appropriate sample size for structural equation modeling (SEM) analysis, this study adopted the guidelines proposed by Hair, Risher, Sarstedt, and Ringle (2019), which recommend (1) an optimal sample size ranging between 100 and 200 respondents, and (2) calculating the sample size based on the total number of indicators across all latent variables, with a multiplier of 5 to 10 times the number of indicators. Following these criteria, this study employed a sample size of 150 respondents, determined by multiplying the total number of indicators (15) by 10, thereby ensuring robust statistical power and model stability for the SEM analysis.

The demographic profiles of the 150 respondents provided a comprehensive representation of PMSol's maritime workforce. The age distribution reveals a predominantly young to middle-aged workforce, with 35% aged 20-30 years, 33% in the 31-40 years bracket, 27% between 41-50 years, and a minority (5%) over 51 years. Geographically, most crew members served domestic routes (93%) rather than international voyages (7%). The gender composition shows a male-dominated industry (93%) with limited female representation (7%). The operated vessel types include product tankers (45%), gas carriers (34%), and crude oil tankers (21%). Position distribution indicates Deck Officers constitute the majority (52%), followed by Engine Officers (32%), Deck Ratings (9%), and Engine Ratings (7%). This profile accurately reflects the demographic and operational characteristics of maritime human resources in Indonesia's shipping sector, ensuring adequate representation across key operational and demographic variables.

3.4. Data Analysis

This study employs a quantitative approach using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0.9.9 to examine the relationships between variables. The PLS-SEM approach was selected for its advantages in handling predictive research with small-to-moderate sample sizes. Its component-based nature allows for the simultaneous examination of multiple relationships while accommodating both formative and reflective measurement models. This method was particularly valuable for testing the mediating role of crew health in the proposed framework. The analysis began with instrument testing to ensure validity and reliability, followed by hypothesis testing and model evaluation. Data were collected from 150 PMSol ship crew members through an online survey using a cross-sectional design to capture responses at a single point in time.

Descriptive statistics provided an overview of the respondents' characteristics, including mean scores and distribution patterns. Responses were interpreted using a 5-point scale (1.00-1.79=Very Low to 4.20-5.00=Very High). The analysis accounted for non-normal data distributions, as PLS-SEM does not require normality assumptions, making it suitable for complex models with formative and reflective constructs. The validity of the research instruments was assessed using convergent and discriminant validity tests. Convergent validity was evaluated using outer loadings (>.70) and Average Variance Extracted (AVE ≥.50), while discriminant validity employed the Fornell-Larcker criterion to ensure that the constructs were distinct. Reliability was confirmed through Composite Reliability (ρ_c >.70) and Cronbach's alpha (α >.60). Additionally, Variance Inflation Factor (VIF) testing verified the absence of multicollinearity issues (VIF <3) in both the measurement and structural models.

Hypothesis testing was conducted using PLS-SEM with bootstrapping (500 subsamples) to examine path coefficients. The significance of the relationships was determined using t-statistics ($p<.05$). The model's predictive power was evaluated using R^2 values, with .19, .33, and .66 indicating weak, moderate, and strong explanatory powers, respectively. The effect size (f^2) and predictive relevance (Q^2) were also calculated, where $Q^2>0$ confirmed the model's predictive capability.

The final model evaluation included Cross-Validated Predictive Ability Testing (CVPAT) to compare the predictive performance against benchmark models. The comprehensive analytical approach ensured

rigorous validation of the research model while providing meaningful insights into the relationships between service quality, crew health, and satisfaction in the maritime logistics context.

4. Results and discussions

4.1. The Result & Data Analysis of Descriptive Statistics, Convergent Validity and Variance Inflation Factor (VIF) Test

Table 1. Descriptive Statistics, Convergent Validity, VIF Test

	Descriptive Statistics					Convergent Validity		Variance Inflation Factor (VIF) Test
	Mean	**Median**	**Min**	**Max**	**Standard deviation**	**Outer Loading**	**AVE**	**VIF**
X1-1	4.207	4.000	2.000	5.000	.742	.858		1,549
X1-2	4.260	4.000	2.000	5.000	.668	.848	.663	1,741
X1-3	4.220	4.000	2.000	5.000	.692	.731		1,381
X2-1	4.193	4.000	2.000	5.000	.746	.753		1,285
X2-2	4.220	4.000	2.000	5.000	.729	.742	.58	1,232
X2-3	4.240	4.000	2.000	5.000	.699	.789		1,244
X3-1	4.420	5.000	2.000	5.000	.751	.765		1,336
X3-2	4.333	4.000	3.000	5.000	.690	.799	.635	1,434
X3-3	4.413	5.000	2.000	5.000	.675	.826		1,435
Z1	4.540	5.000	3.000	5.000	.561	.713		1,327
Z2	4.280	4.000	2.000	5.000	.767	.767	.562	1,13
Z3	4.480	5.000	2.000	5.000	.650	.767		1,338
Y1	4.640	5.000	3.000	5.000	.557	.762		1,25
Y2	4.467	5.000	2.000	5.000	.639	.775	.588	1,295
Y3	4.700	5.000	2.000	5.000	.526	.763		1,263

As shown in Table 1, the analysis of the descriptive statistics provides a comprehensive overview of the respondents' perceptions across all measured variables. Crew Satisfaction (Y) achieved the highest mean scores among all constructs, with indicators Y3 (mean=4.700) and Y1 (mean=4.640) showing particularly strong results. The relatively low standard deviations (Y3 SD=.526; Y1 SD=.580) indicate a high response consistency among the participants. For the Crew Health variable (Z), indicator Z1 recorded a mean of 4.540 with a standard deviation of .561, demonstrating both favorable ratings and uniformity in responses. The Product Quality dimension (X3) showed slightly more variation, particularly for indicator X3-1 (mean=4.420, SD=.751), suggesting some diversity in product quality perceptions while maintaining generally positive evaluations of the product. Reliability (X1) and Responsiveness (X2) variables both maintained mean scores above 4.0 across all indicators, with standard deviations ranging from .650 to .746, indicating stable positive assessments with moderate response variations. The median values for all variables consistently fell between 4.000-5.000, confirming that most respondents provided favorable ratings. These robust descriptive results establish a solid foundation for subsequent validity and reliability testing while providing valuable preliminary insights into crew members' service quality perceptions in maritime operations.

Furthermore, as shown in Table 1, the measurement model demonstrated strong convergent validity through two criteria: (1) outer loadings exceeding 0.7, confirming indicator-construct correlations (Ghozali & Latan, 2014), and (2) Average Variance Extracted (AVE) values >.5, indicating that constructs explained >50% of the indicator variance. While .5-.6 loadings remain acceptable in scale development studies, all indicators in this research met the .7 threshold, ensuring reliable measurement of their respective constructs without conceptual deviations.

Moreover, as shown in Table 1, the Variance Inflation Factor (VIF) results confirmed the absence of multicollinearity, with all values below 3 (Hair et al., 2019). This indicates that the indicators maintained sufficient independence, as no item showed excessive correlation (VIF≥5) or potential

overlap (VIF 3-5). The findings validate the measurement model's accuracy by ensuring indicator distinctness and minimizing mutual influence during parameter estimation.

4.2. The Result &Data Analysis of Discriminant Validity (Fornell-Larcker), Reliability, and F Square Test

Table 2. Discriminant Validity (Fornell-Larcker), Reliability, F Square Test

	Discriminant Validity (Fornell-Larcker)					Reliability Test		F Square Test		
	X1	**X2**	**X3**	**Y**	**Z**	**Cronbach's alpha**	**(rho_c)**		**f-square**	**Notes**
X1	.8145					.749	.855	X1 -> Y	.022	Low
								X1 -> Z	.066	Low
X2	.6619	.7613				.639	.805	X2 -> Y	.156	Medium
								X2 -> Z	.060	Low
X3	.6131	.6066	.7971			.713	.839	X3 -> Y	.070	Low
Y	.4755	.6508	.6276	.7494		.619	.793	X3 -> Z	.207	Medium
Z	.6363	.6296	.6858	.6536	.7668	.65	.811	Z -> Y	.103	Low

As shown in Table 2, the discriminant validity assessment using the Fornell-Larcker approach confirmed that all constructs in the research model were empirically distinct. The square roots of the AVE for each construct (X1=.814, X2=.761, X3=.797, Y=.749, Z=.766) along the diagonal exceed all corresponding inter-construct correlations in the off-diagonal positions. This finding satisfies the Fornell–Larcker criterion (Ghozali & Latan, 2014), demonstrating adequate discriminant validity. The results confirmed that each latent variable measured a unique concept, with no significant overlap between constructs, thus validating the measurement model's ability to distinguish between different theoretical concepts in subsequent analyses.

Furthermore, as shown in Table 2, the constructs demonstrated excellent internal consistency, with composite reliability (rho_c) values exceeding the .7 threshold recommended by Hair et al. (2019) for SEM analysis. Cronbach's alpha values were also reported as supplementary information; they consistently fell within the acceptable range of .4-.7, further supporting the scales' reliability (Ruseffendi, 2005). These results indicate that all measurement instruments consistently captured their intended constructs, with the rho_c values confirming the stability of the measurements in the structural equation modeling context. The combination of both reliability metrics provides comprehensive evidence of the scales' psychometric soundness.

Moreover, as shown in Table 2, the effect size analysis revealed varying magnitudes of predictive relationships in the model. Reliability (X1) showed weak effects on crew satisfaction (Y) (f^2=.022) and crew health (Z) (f^2=.066). Responsiveness (X2) demonstrated a moderate effect on satisfaction (f^2=.156) but a weak influence on health (f^2=.060). Product quality (X3) exhibited a weak impact on satisfaction (f^2=.070) but a moderate effect on health (f^2=.207). The mediating variable, crew health (Z), showed a weak effect on satisfaction (f^2=.103). These findings, interpreted using Cohen's (1988) guidelines (.02=small, .15=medium, .35=large), provide a nuanced understanding of the relative importance of each predictor variable in the research model.

4.3. The Result & Data Analysis of R Square Test, Predictive Relevance, and CVPAT Cross-Validated Predictive Ability Test (CVPAT)

Table 3. R Square Test, Predictive Relevance, CVPAT Test

	R Square (R2) Test		Predictive Relevance	Cross-Validated Predictive Ability Test (CVPAT)			
	R-square	R-square adjusted	Q^2predict	Average Loss Difference (ALD)	T value	P value	Note
Y	.557167	.544951	.484	-.089	3.331	.001	Significant
Z	.570802	.561983	.543	-.143	4.192	.000	Significant
Overall				-.116	4.016	.000	Significant

As shown in Table 3, the coefficient of determination analysis revealed a moderate predictive power for the endogenous variables. Crew Satisfaction (Y) achieved an R^2 of 0.557 (adjusted R^2=.544), classified as a moderate effect size according to Chin (1998), indicating that 55.7% of the satisfaction variance is explained by the predictor variables. Crew Health (Z) showed a stronger predictive power with R^2=.570 (adjusted R^2=.561), falling into the high-effect category. The minimal differences between the R^2 and adjusted R^2 values (≤.016) confirm model stability without overfitting, particularly for the health variable, which demonstrated superior explanatory power. These results empirically validate the structural model's capability to explain both target constructs.

Furthermore, as shown in Table 3, the predictive relevance of the model was evaluated using Q^2 values, where Q^2>0 indicates adequate predictive power (Ghozali & Latan, 2014). Crew Health (Z) demonstrated strong predictive relevance (Q^2=.543), whereas Crew Satisfaction (Y) showed a weaker but acceptable predictive capability (Q^2=.0484). This differential performance suggests that the model more effectively predicts health outcomes than satisfaction levels, possibly reflecting the more direct relationship between service quality indicators and physical well-being compared to the more complex determinants of overall satisfaction in maritime service contexts.

Moreover, as shown in Table 3, the Cross-Validated Predictive Ability Test (CVPAT Test) confirmed the superiority of PLS-SEM over the Indicator Average (IA) approach. For Crew Satisfaction (Y), PLS-SEM showed a significantly lower prediction error (average loss difference=-.089, t=3.331, p=.001). The advantage was more pronounced for Crew Health (Z) (difference=-.143, t=4.192, p<.001). Overall, PLS-SEM demonstrated consistent predictive superiority (aggregate difference=-.116, t=4.016, p<.001), justifying its use for modeling complex relationships in maritime service research. These results not only validate the research model but also highlight the effectiveness of PLS-SEM in capturing industry-specific operational dynamics.

4.4. The Result & Data Analysis of Hypothesis (T-Test)

Table 4. Hypothesis Testing

	Variable	VIF	STDEV	T values	P values
H1	X1 -> Z	2.04	.093	2.566	.01
H2	X2 -> Z	2.01	.089	2.559	.011
H3	X3 -> Z	1.81	.085	4.721	0
H4	X1 -> Y	2.33	.085	1.718	.086
H5	X2 -> Y	2.17	.091	4.212	0
H6	X3 -> Y	2.13	.092	2.839	.005
H7	Z -> Y	2.18	.099	3.302	.001
H8	X1 -> Z -> Y		.037	2.105	.035
H9	X2 -> Z -> Y		.037	1.99	.047
H10	X3 -> Z -> Y		.054	2.436	.015

As shown in Table 4, the hypothesis testing in this study aimed to evaluate the relationships between the latent variables in the structural model. This evaluation was conducted by analyzing the path coefficients and T-statistics obtained through the bootstrapping technique with 500 samples. Path coefficients describe the strength and direction of the influence between constructs, as specified in the hypotheses. Positive coefficients (>0) indicate positive relationships, whereas negative coefficients (<0) indicate inverse relationships. The bootstrapping technique generated T-statistic distributions used to determine relationship significance, with values >1.96 at the 5% significance level (p<.05) considered statistically significant. These results were visualized in a path diagram showing the coefficients and T-statistics for all model relationships.

4.4.1. Hypothesis 1 (H1): Reliability (X1) → Crew Health (Z)

The first hypothesis test yielded a T-statistic of 2.566 (p=.010<.05), supporting H1. This indicates that reliability significantly affects crew health, with a positive coefficient suggesting that improved reliability enhances health conditions. The VIF of 2.03 confirms no multicollinearity between reliability and crew health (VIF<5). Previous studies by Jimanto (2014) and Vu (2021) support these findings, demonstrating the crucial role of reliability in maintaining crew health through consistent delivery, product quality, and accurate information. At PMSol, descriptive data showed that indicator X1-2 (quality consistency) had the highest mean (4.227, "Very High" category) among reliability measures, with a low standard deviation (0.665), indicating respondent consensus.

4.4.2. Hypothesis 2 (H2): Responsiveness (X2) → Crew Health (Z)

The second hypothesis test produced a T-statistic of 2.559 (p=.011<.05), supporting H2. This proves that responsiveness significantly influences crew health, with a positive coefficient indicating that better responsiveness improves health outcomes (VIF=2.01<5). These findings align with Lau and Yip (2017) and Maramis, Sepang, and Soegoto (2018), who identified emergency response capability and nutritional supply chain management as critical health determinants. At PMSol, indicator X2-3 (complaint handling speed) showed the highest mean (4.327, "Very High") and lowest standard deviation (.648) among responsiveness measures, reflecting a strong positive consensus.

4.4.3. Hypothesis 3 (H3): Product Quality (X3) → Crew Health (Z)

The third hypothesis test revealed a highly significant T-statistic of 4.721 (p=.000<.05), strongly supporting H3. The large coefficient confirms that product quality is the dominant factor affecting crew health (VIF=1.81<5). Research by Daryanto and Setyobudi (2014) and Maramis et al. (2018) corroborates these results, emphasizing nutritional food quality and medical equipment standards as primary health determinants. PMSol's quality control practices showed significant effects, with indicators X3-1 (completeness) and X3-3 (hygiene) both having "Very High" means (4.427 and 4.393, respectively), despite relatively higher standard deviations (>.69) indicating some response variation.

4.4.4. Hypothesis 4 (H4): Reliability (X1) → Crew Satisfaction (Y)

The fourth hypothesis test showed a T-statistic of 1.718 (p=.086>.05), rejecting H4. Although the path coefficient was positive, its strength did not reach statistical significance (VIF=2.33<5). This aligns with Sayekti, Tarigan, Endang Wijayanti, and Utami (2022), who found that reliability might not directly affect satisfaction in certain service contexts. At PMSol, despite "High" to "Very High" means for reliability indicators (X1-1=4.180, X1-2=4.227, X1-3=4.160), their impact on satisfaction was insignificant, suggesting that the influence of reliability occurs indirectly through health improvement, as tested in subsequent hypotheses.

4.4.5. Hypothesis 5 (H5): Responsiveness (X2) → Crew Satisfaction (Y)

The fifth hypothesis test produced a significant T-statistic of 4.212 (p=.000<.05), supporting H5. The large coefficient establishes responsiveness as a key determinant of satisfaction (VIF=2.17<5). Mary et al. (2023) similarly, identified responsiveness as a primary satisfaction driver in maritime services through quick request handling and effective complaint resolution. PMSol's implementation showed that indicator X2-3 (facility condition checks) had the highest mean (4.327, "Very High") and lowest standard deviation (.648), reflecting consistent positive evaluations.

4.4.6. Hypothesis 6 (H6): Product Quality (X3) → Crew Satisfaction (Y)
The sixth hypothesis test yielded a T-statistic of 2.839 (p=.005<.05), supporting H6. The positive coefficient confirms that product quality significantly enhances customer satisfaction (VIF=2.13<5). Daryanto and Setyobudi (2014) and P. Kotler and Keller (2016) found that product quality exceeding expectations, particularly for nutritious food and safe equipment, was strongly correlated with user satisfaction. PMSol's efforts showed that all product quality indicators (X3-1=4.427, X3-2>4.2, X3-3=4.393) achieved "Very High" means, despite standard deviations >.5 indicating some perception variation.

4.4.7. Hypothesis 7 (H7): Crew Health (Z) → Crew Satisfaction (Y)
The seventh hypothesis test revealed a significant T-statistic of 3.302 (p=.001<.05), supporting H7. This proves that crew health positively affects satisfaction (VIF=2.18<5). Gu et al. (2020); Sharma, Liengaard, Hair, Sarstedt, and Ringle (2023) corroborate that optimal physical health enables more productive and comfortable work, ultimately increasing job satisfaction. Secondary data show that companies with strong health programs achieve 25% higher satisfaction. At PMSol, indicators Z1 (nutritional quality, mean=4.547) and Z3 (safety, mean=4.480), both "Very High," were key factors.

4.4.8. Hypothesis 8 (H8): Reliability (X1) → Crew Health (Z) → Crew Satisfaction (Y)
The eighth hypothesis test showed a T-statistic of 2.105 (p=.035<.05), supporting H8. This confirms that crew health significantly mediates the effect on the satisfaction. Gu et al. (2020); Vu (2021) found similar patterns where reliable services affect satisfaction through health improvements by consistently providing basic health necessities. At PMSol, trust in problem response (X1-2 mean=4.227) enhanced perceived health, subsequently affecting satisfaction, explaining why the direct effect of reliability (H4) was insignificant, as its primary influence occurred through this mediation path.

4.4.9. Hypothesis 9 (H9): Responsiveness (X2) → Crew Health (Z) → Crew Satisfaction (Y)
The ninth hypothesis test produced a T-statistic of 1.990 (p=.047<.05), supporting H9. This establishes crew health as a significant mediator between responsiveness and satisfaction. Lau and Yip (2017); Maramis et al. (2018) explain this through consistent emergency health need responses, where quick reactions to medicine or special food requests prevent serious health issues. PMSol's practices showed regular facility checks (X2-3 mean=4.327) and service readiness (X2-1 mean=4.207), both "Very High," which contributed to perceived health improvements that increased satisfaction.

4.4.10. Hypothesis 10 (H10): Product Quality (X3) → Crew Health (Z) → Crew Satisfaction (Y)
The tenth hypothesis test yielded a T-statistic of 2.436 (p=.015<.05), supporting H10. This confirms that crew health significantly mediates product quality and satisfaction. Daryanto and Setyobudi (2014) and P. Kotler and Keller (2016) found that high-quality products, especially nutritious foods, directly improve consumer health. At PMSol, complete facilities (X3-1 mean=4.427) and clean, hygienic food products (X3-3 mean=4.393), both rated as "Very High," enhanced the perceived crew health, subsequently increasing satisfaction.

5. Conclusions

5.1. Conclusion

This study reveals three key findings regarding the impact of service quality on PMSol. First, reliability, responsiveness, and product quality significantly affected crew health, with product quality showing the strongest influence. Second, while responsiveness and product quality directly enhance crew satisfaction, reliability only indirectly impacts satisfaction through improved health. A novel finding suggests that health acts as a full mediator of reliability but a partial mediator of other factors. Third, the mediation analysis demonstrates that health serves as a critical pathway linking service quality to satisfaction, emphasizing its central role in maritime service evaluations.

To optimize service quality, PMSol should prioritize four strategic improvements: (1) implementing digital inventory management for real-time stock monitoring, (2) optimizing logistics networks through smart route analysis, (3) intensive training programs for ship chandler staff focusing on complex request handling, and (4) establishing 24/7 emergency response units. These measures specifically target

reliability gaps while maintaining the existing responsiveness and product quality standards. The health mediation findings further suggest integrating crew health metrics into service KPIs and developing digital platforms linking service data with medical records.

Beyond its practical implications, this study advances maritime management research by positioning crew health as a pivotal mediating construct in service quality theory. Unlike prior studies that emphasize the effects of service quality primarily on satisfaction or loyalty, the findings demonstrate that in maritime contexts, health is not merely an outcome variable but a central mechanism through which service attributes operate. This enriches the application of the SERVQUAL framework by adapting it to high-risk, labor-intensive environments, where reliability contributes to satisfaction only when it is filtered through health outcomes. By integrating human well-being into service evaluation, this study expands the theoretical discourse in maritime logistics, offering a human-centered lens for future research on supply chain services in seafaring industries.

5.2. Suggestions

Based on the study's findings and conclusions, several recommendations are proposed.

1. For PMSol and Maritime Practitioners
    a. Strengthen product quality control: As product quality has the strongest impact on crew health and satisfaction, PMSol should implement stricter quality assurance mechanisms, including freshness inspections, supplier audits, and hygiene certifications.
    b. Enhancing Reliability Through System Integration: Reliability gaps can be minimized by adopting digital inventory management systems and integrating them with logistics operations to ensure consistency and timeliness in supply deliveries.
    c. Embed Health Metrics into Service Evaluation: Develop crew health monitoring as a key performance indicator (KPI) for service evaluation, linking supply chain performance directly to the nutrition and health outcomes of crew members.
    d. Improve Responsiveness via Training and Emergency Systems: Provide regular training for ship chandler staff on handling urgent and complex crew requests and establish 24/7 emergency response units to support critical supply needs.
    e. Leveraging Technology for Crew Well-Being: Digital platforms that connect supply service data with crew health records should be created to enable real-time monitoring and proactive interventions when supply quality affects well-being.
2. For Policy Makers and Industry Stakeholders
    a. Incorporate health-centered service standards into maritime regulations to ensure that crew welfare is embedded within supply chain compliance frameworks.
    b. Promote collaboration between ship chandler companies, health authorities, and port agencies to develop integrated maritime welfare policies.
3. For Future Research
    a. Longitudinal studies should be conducted to capture changes in service quality, health, and satisfaction across different voyages, overcoming the limitations of the cross-sectional design used in this study.
    b. Expanding the model by including additional variables such as safety culture, digitalization, or leadership practices to gain deeper insights into the holistic determinants of crew satisfaction.
    c. The framework should be applied to different maritime contexts and companies beyond PMSol, thereby strengthening the generalizability of the findings in the global shipping and logistics sectors.

Acknowledgement

We sincerely thank the management and crew members of PT Pertamina Marine Solution (PMSoL) for their invaluable support in data collection and for sharing operational insights that made this research possible. Their cooperation was essential in examining ship chandler service quality and its impact on maritime operations.

References

Afroj, S., Hanif, F., Hossain, M. B., Fuad, N., Islam, I., Sharmin, N., & Siddiq, F. (2021). Assessing the Municipal Service Quality of Residential Neighborhoods based on SERVQUAL, AHP and Citizen's Score Card: A Case Study of Dhaka North City Corporation Area, Bangladesh. *Journal of Urban Management, 10*(3), 179-191. doi:https://doi.org/10.1016/j.jum.2021.03.001

Baum-Talmor, P., & Şahin, Ç. E. (2024). Employment Practices, Cost Minimization, and Their Implications for Food Provisions and Seafarers' Wellbeing on board Ships–A Qualitative Analysis. *INQUIRY: The Journal of Health Care Organization, Provision, and Financing, 61*. doi:https://doi.org/10.1177/00469580241229613

Bauweraerts, J., Arzubiaga, U., & Diaz-Moriana, V. (2022). Unveiling the Global Focus-Performance Relationship in Family Firms: The Role of the Board of Directors. *International Business Review, 31*(4). doi:https://doi.org/10.1016/j.ibusrev.2022.101977

Chaerudin, S. M., & Syafarudin, A. (2021). The Effect of Product Quality, Service Quality, Price on Product Purchasing Decisions on Consumer Satisfaction. *Ilomata International Journal of Tax and Accounting, 2*(1), 61-70. doi:https://doi.org/10.52728/ijtc.v2i1.202

Chandranegara, I. S., & Cahyawati, D. P. (2023). Conflict of interest prevention clause in the constitution: The study of the Indonesian Constitution. *Heliyon, 9*(3). doi:https://doi.org/10.1016/j.heliyon.2023.e14679

Chege, C. N. (2021). Examining the Influence of Service Reliability on Customer Satisfaction in the Insurance Industry in Kenya. *International Journal of Research in Business and Social Science, 10*(1), 259-265. doi:https://doi.org/10.20525/ijrbs.v10i1.1025

Chin, W. W. (1998). The Partial Least Squares Approach to Structural Equation Modeling *Modern Methods for Business Research* (pp. 295-336): Psychology Press.

Chirikov, I. (2023). Does Conflict of Interest Distort Global University Rankings? *Higher Education, 86*(4), 791-808. doi:https://doi.org/10.1007/s10734-022-00942-5

Daryanto, & Setyobudi, I. (2014). *Konsumen dan Pelayanan Prima*. Yogyakarta: Gava Media.

Dewi, R. C., & Suparno. (2022). Mewujudkan Good Governance Melalui Pelayanan Publik. *Jurnal Media Administrasi, 7*(1), 78-90. doi:https://doi.org/10.56444/jma.v7i1.67

Eslamdoost, S., King, K. A., & Tajeddin, Z. (2020). Professional Identity Conflict and (Re) Construction among English teachers in Iran. *Journal of Language, Identity & Education, 19*(5), 327-341. doi:https://doi.org/10.1080/15348458.2019.1676157

Ghozali, I., & Latan, H. (2014). Partial Least Squares Konsep, Metode dan Aplikasi menggunakan Program WarpPLS 4.0. *Semarang: Badan Penerbit Universitas Diponegoro, 57*.

Grace, E., Girsang, R. M., Simatupang, S., Candra, V., & Sidabutar, N. (2021). Product Quality and Customer Satisfaction and their Effect on Consumer Loyalty. *International Journal of Social Science, 1*(2), 69-78. doi:https://doi.org/10.53625/ijss.v1i2.138

Gu, Y., Liu, D., Zheng, G., Yang, C., Dong, Z., & Tee, E. Y. (2020). The Effects of Chinese Seafarers' Job Demands on Turnover Intention: The Role of Fun at Work. *International Journal of Environmental Research and Public Health, 17*(14), 1-12. doi:https://doi.org/10.3390/ijerph17145247

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to Use and How to Report the Results of PLS-SEM. *European Business Review, 31*(1), 2-24. doi:https://doi.org/10.1108/EBR-11-2018-0203

Herudiansyah, G., Fitantina, F., & Suandini, M. (2023). Pengaruh Kualitas Pelayanan Reliability, Responsiveness dan Assurance Terhadap Kepuasan Pasien Rumah Sakit Muhammadiyah. *Motivasi, 8*(1), 9-17. doi:https://doi.org/10.32502/mti.v8i1.5663

ILO. (2014). *Guidelines on the Training of Ships' Cooks*. Geneva: International Labour Organization.

Jamil, J., Mallapiang, F., & Multazam, A. M. (2023). Analisis Unsafe Action dan Unsafe Condition dengan Kecelakaan Kerja pada Awak Kapal Penyeberangan Bira-Pamatata. *Journal of Muslim Community Health, 4*(1), 251-264. doi:https://doi.org/10.52103/jmch.v4i1.1285

Jimanto, R. B. (2014). Pengaruh Service Quality Terhadap Loyalitas Pelanggan dengan Customer Satisfaction Sebagai Variabel Intervening pada Ritel Bioskop The Premiere Surabaya. *Jurnal Strategi Pemasaran, 2*(1), 1-7.

Kim, M., & Chang, B. (2020). The Effect of Service Quality on the Reuse Intention of a Chatbot: Focusing on User Satisfaction, Reliability, and Immersion. *International Journal of contents, 16*(4), 1-15. doi:https://doi.org/10.5392/IJoC.2020.16.4.001

Kotler, P., & Keller, K. L. (2016). *Marketing Management (15th ed.)*. New York: Pearson Education.

Kotler, P. T., & Armstrong, G. (2020). *Principles of Marketing 18th Edition* London: Pearson Education.

Lau, Y.-y., & Yip, T. L. (2017). The Procurement of Food on Board Liner Ships: The Role of the International Labor Organization. *Journal of Shipping and Trade, 2*(1), 1-14. doi:https://doi.org/10.1186/s41072-017-0024-8

Lu, Y., Gao, Y., Cao, Z., Cui, J., Dong, Z., Tian, Y., & Xu, Y. (2010). A Study of Health Effects of Long-Distance Ocean Voyages on Seamen Using a Data Classification Approach. *BMC Medical Informatics and Decision Making, 10*(1), 1-7. doi:https://doi.org/10.1186/1472-6947-10-13

Mahsyar, S., & Surapati, U. (2020). Effect of Service Quality and Product Quality on Customer Satisfaction and Loyalty. *International Journal of Economics, Business and Accounting Research (IJEBAR), 4*(1), 204-211. doi:https://doi.org/10.29040/ijebar.v4i01.950

Maramis, F. S., Sepang, J. L., & Soegoto, A. S. (2018). Pengaruh Kualitas Produk, Harga dan Kualitas Pelayanan Terhadap Kepuasan Konsumen pada PT. Air Manado. *Jurnal EMBA: Jurnal Riset Ekonomi, Manajemen, Bisnis dan Akuntansi, 6*(3), 1658-1667. doi:https://doi.org/10.35794/emba.6.3.2018.20411

Mary, S. R., Sharma, S., Malviya, B., Hamida, A. G. B., & Zala, D. M. (2023). Service Quality Towards Retail Stores on Expected and Perceived Service Quality. *International Journal of Professional Business Review, 8*(4), 1-17. doi:https://doi.org/10.26668/businessreview/2023.v8i4.1243

McCartney, G., Popham, F., McMaster, R., & Cumbers, A. (2019). Defining Health and Health Inequalities. *Public Health, 172*, 22-30. doi:https://doi.org/10.1016/j.puhe.2019.03.023

Murjani, M. (2022). Prosedur Penelitian Kuantitatif. *Cross-border, 5*(1), 687-713.

Myznikov, I., Makhrov, M., & Val'skiĭ, V. (2000). Morbidity in seamen During Long Voyages According to the Results of Long-Term Studies (Report II). *Voenno-Meditsinskii Zhurnal, 321*(7), 60-63.

Nes, K., Antonioli, F., Di Marcantonio, F., & Ciaian, P. (2024). The Impact of Pre-Empting Dual Food Quality Regulation on Product Reformulation and Packaging. *Food Policy, 128*, 1-17. doi:https://doi.org/10.1016/j.foodpol.2024.102707

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988). SERVQUAL: A Multiple-Item Scale for Measuring Customer Perceptions of Service Quality. *Journal of retailing, 64*(1), 12-40.

Primadianto, D., Putri, S. K., & Alifen, R. S. (2018). Pengaruh Tindakan Tidak Aman (Unsafe Act) dan Kondisi Tidak Aman (Unsafe Condition) Terhadap Kecelakaan Kerja Konstruksi. *Jurnal Dimensi Pratama Teknik Sipil, 7*(1), 77-84.

Protasov, V., Slezinger, V., & Antiukhova, M. (1996). The Dynamics of Anti-Influenza Immunity in Sailors of the Baltic Fleet. *Voenno-Meditsinskii Zhurnal, 317*(9), 33-34.

Ruseffendi. (2005). *Dasar-dasar Penelitian Pendidikan & Bidang Non-Eksakta Lainnya*. Bandung: Tarsito.

Sayekti, F., Tarigan, B., Endang Wijayanti, L., & Utami, R. (2022). Pengaruh Dimensi Kualitas Pelayanan Terhadap Kepuasan Pemakai Layanan Jasa. *Jurnal Riset Akuntansi dan Auditing, 9*(1), 16-27. doi:https://doi.org/10.55963/jraa.v9i1.437

Sharma, P. N., Liengaard, B. D., Hair, J. F., Sarstedt, M., & Ringle, C. M. (2023). Predictive Model Assessment and Selection in Composite-Based Modeling Using PLS-SEM: Extensions and Guidelines for Using CVPAT. *European Journal of Marketing, 57*(6), 1662-1677. doi:https://doi.org/10.1108/EJM-08-2020-0636

Shukri, S. M., Yajid, M., & Tham, J. (2020). Role of Responsiveness, Reliability and Tangibility on Customer Satisfaction. *Systematic Reviews in Pharmacy, 11*(1), 1007-1013. doi:https://dx.doi.org/10.5530/srp.2020.1.127

Suherman, A., & Sirajuddin, A. (2018). Kearifan Lokal Sebagai Basis Komunikasi Pemerintah dalam Penyelesaian Konflik Sosial dan Komunal. *Dialektika: Jurnal Ekonomi dan Ilmu Sosial, 3*(2), 34-42. doi:https://doi.org/10.36636/dialektika.v3i2.152

Syafarudin, A. (2021). The Effect of Product Quality on Customer Satisfaction Implications on Customer Loyalty in the Era Covid-19. *Ilomata International Journal of Tax and Accounting, 2*(1), 71-83. doi:https://doi.org/10.52728/ijtc.v2i1.204

Taufik, A., Santoso, S., Fahmi, M. I., Restuanto, F., & Yamin, S. (2022). The Role of Service and Product Quality on Customer Loyalty. *Journal of Consumer Sciences, 7*(1), 68-82. doi:https://doi.org/10.29244/jcs.7.1.68-82

Thomson, M. (2022). Legal Determinants of Health. *Medical Law Review, 30*(4), 610-634. doi:https://doi.org/10.1093/medlaw/fwac025

Vu, T. (2021). *Service Quality and its Impact on Customer Satisfaction.* University of Northampton, United Kingdom.