

**THE EFFECT OF SERVICE QUALITY DIMENSIONS ON CUSTOMER SATISFACTION WITH TRUST AS A MEDIATING VARIABLE:
A STUDY ON KABIL PORT BATAM SERVICE USERS**

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Abstract

Kabil Port Batam is a strategic port node serving processing industries in the Batam free trade zone, with an entirely corporate user base. This study examines the effect of five service quality dimensions, namely tangible, reliability, responsiveness, assurance, and empathy, on customer satisfaction, both directly and through trust as a mediating variable. A quantitative approach was applied to 394 respondents from approximately 219 user companies selected purposively. Data were analyzed using Partial Least Square Structural Equation Modeling with SmartPLS 4.0 and bootstrapping of 3,000 subsamples. The results show that empathy has a positive and significant effect on customer satisfaction with a coefficient of 0.382, followed by assurance at 0.343. Assurance is the only dimension significantly affecting trust, with a coefficient of 0.254. Tangible, reliability, and responsiveness are not significant, although all three correlate strongly with satisfaction, ranging from 0.795 to 0.825. Trust has no significant effect on customer satisfaction and does not mediate any service quality dimension. The model explains 79.4 percent of the variance in customer satisfaction. This study contributes by demonstrating that satisfaction and trust in business-to-business port services are formed through different mechanisms, namely satisfaction through the quality of personal interaction and trust through institutional assurance

Keywords: service quality; assurance; empathy; trust; customer satisfaction; ports

Abstrak

Pelabuhan Kabil Batam merupakan simpul kepelabuhanan strategis yang melayani industri pengolahan di kawasan perdagangan bebas Batam dengan pengguna jasa yang seluruhnya bersifat korporat. Penelitian ini menguji pengaruh lima dimensi kualitas pelayanan, yaitu tangible, reliability, responsiveness, assurance, dan empathy terhadap customer satisfaction, baik secara langsung maupun melalui trust sebagai variabel mediasi. Penelitian menggunakan pendekatan kuantitatif dengan 394 responden dari sekitar 219 perusahaan pengguna jasa yang dipilih secara purposif. Data dianalisis dengan Partial Least Square Structural Equation Modeling menggunakan SmartPLS 4.0 dan bootstrapping 3.000 subsampel. Hasil penelitian menunjukkan empathy berpengaruh positif dan signifikan terhadap customer satisfaction dengan koefisien 0,382, diikuti assurance dengan koefisien 0,343. Assurance merupakan satu-satunya dimensi yang berpengaruh signifikan terhadap trust dengan koefisien 0,254. Tangible, reliability, dan responsiveness tidak berpengaruh signifikan, meskipun ketiganya berkorelasi kuat dengan kepuasan pada rentang 0,795 sampai 0,825. Trust tidak berpengaruh signifikan terhadap customer satisfaction dan tidak memediasi pengaruh satu pun dimensi kualitas pelayanan. Model menjelaskan 79,4 persen variasi customer satisfaction. Penelitian ini berkontribusi dengan menunjukkan bahwa kepuasan dan kepercayaan pada layanan kepelabuhanan business to business dibentuk oleh mekanisme yang berbeda, yaitu kepuasan oleh kualitas interaksi personal dan kepercayaan oleh jaminan institusional.

Kata Kunci: kualitas pelayanan; assurance; empathy; trust; customer satisfaction; pelabuhan

INTRODUCTION

The port is knot critical in chain supply national and international . Failure or unreliability service harbor impact directly to the company shipping and owners goods , and in the end cause dissatisfaction users services (Yeo, Thai, & Roh, 2015). In Indonesian context , issues This the more relevant remember position geographically an archipelagic country that is located harbor as bone back distribution goods.

Kabil Port Batam is located in Kabil Village , District Nongsa , Batam City, and is managed by the Batam Business Agency. This port serve distribution rainfall liquid , especially crude palm oil and products its derivatives , as well as connected through pipe network with industry refinery in the area Kabil industry . Batam's position as area trading free make port services This involving coordination cross agency in the form of customs , immigration , quarantine , and harbormaster . The existence of A number of other terminals in Batam provide alternative for users services , so that satisfaction users become issue real managerial for manager.

Study about quality service harbor has growing , but part big put quality service as construct single and test its influence in a way direct to satisfaction . Thai (2016) found that port service quality has an effect positive significant to satisfaction customers in the sector Singapore port. Yeo and friends (2015) on ports chest pack Korea instead find that Of the five factors of port service quality, only some of the influential significant . Difference findings the show that contribution each dimensions quality service nature contextual and not yet can generalized .

On the other hand , the role trust as variables mediation between quality service and satisfaction Still show results that are not consistent . Some research find significant mediation , while Fardan, Mardhotillah , Chusnaini , and Rasyid (2026) on services courier in Surabaya and Sidoarjo find that trust does not significant mediate connection quality service and satisfaction customers. Inconsistency This open gap research , especially in the context of business to business services with attachment high technical like port , which is characteristics different from service consumer end.

Based on description said , research This aim test the influence of each dimension quality service towards user customer satisfaction Kabil Batam Port services , as well as test the role of trust as variables mediation . Novelty study This lies in testing dimensions quality service in a way separate in context harbor rainfall liquid in the area trading free , as far as search writer Not yet Lots researched.

THEORY AND HYPOTHESIS DEVELOPMENT

Quality of Service

Parasuraman, Zeithaml, and Berry (1988) developed the SERVQUAL instrument that measures service quality through five dimensions: tangibles (physical facilities and equipment); reliability (the ability to provide services as promised); responsiveness (the willingness to help quickly); assurance (the knowledge and courtesy of staff that fosters confidence); and empathy (individual attention to customers). These five dimensions have been widely applied in various service sectors, including ports.

Trust and Satisfaction

Morgan and Hunt (1994), through their commitment-trust theory, position trust as a key variable in relationship marketing, which is formed from the competence and integrity consistently demonstrated by the service provider. Satisfaction, according to Oliver (1980), is the result of comparing expectations with perceived performance, thus being an evaluative measure of the experience.

Hypothesis Development

Good service quality provides repeated positive experiences and forms the basis for building user confidence in the service provider. Based on this, the study formulated Hypotheses H1 to H5, namely tangible, reliability, responsiveness, assurance, and empathy each have an influence positive towards trust.

In accordance theory disconfirmation expectations, performance services that meet or beyond hope will produce satisfaction. Based on this, the study formulated Hypotheses H6 to H10, namely tangible, reliability, responsiveness, assurance, and empathy each have an influence positive towards customer satisfaction.

Trust reduce perception risk and uncertainty in transaction services, so that allegedly increase satisfaction. Based on this, the study formulated H11, namely trust has an influence positive on customer satisfaction, as well as H12 to H16, namely trust mediates the influence of each dimension quality service towards customer satisfaction.

RESEARCH METHODS

This study employs a quantitative approach with a cross-sectional research design. The study population consists of companies utilizing the services of Kabil Port in Batam, Indonesia. Respondents are employees possessing direct knowledge or experience regarding the port services provided by Kabil Port.

The sample was selected using a purposive sampling technique based on pre-established criteria. Specifically, respondents were required to be employees of companies

that had utilized Kabil Port's services for at least six months and possessed a sufficient understanding of service quality, trust, and customer satisfaction aspects related to those services. These criteria were established to ensure that respondents had adequate experience to provide relevant and well-founded assessments regarding the variables under study.

A total of 394 valid questionnaires were obtained from approximately 219 companies or business units and deemed suitable for further analysis. The sample size was determined by considering the requirements of the Partial Least Squares Structural Equation Modeling (PLS-SEM) method, particularly the complexity of the research model and the number of indicators used to measure the constructs. The final sample of 394 respondents was considered adequate for evaluating the proposed structural relationships. [Specific sample size determination methods or statistical calculations should be explained here, if relevant.]

Respondents originated from approximately 219 companies or business units. [Please clarify whether multiple respondents from the same company were permitted and, if so, how respondents were selected to minimize potential clustering effects.] Respondent selection focused on employees who understood their company's experience in using Kabil Port's services.

Data were collected via structured questionnaires distributed between January and August 2026. The questionnaires were administered through online surveys and direct distribution to eligible respondents from companies utilizing Kabil Port's services. Participation was voluntary, and respondents were informed of the study's objectives. To minimize potential response bias, respondents were assured that their answers would remain confidential and be used solely for academic research purposes. Furthermore, the questionnaire was designed using clear and neutral statements to reduce ambiguity and the likelihood of leading questions.

Service quality was measured using 29 items representing the five SERVQUAL dimensions: tangibles (seven items), reliability (five items), responsiveness (five items), assurance (six items), and empathy (six items). Trust was measured using a single item, while customer satisfaction was measured using three items. All measurement items utilized a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

The measurement instrument was adapted from prior research and tailored to the context of port services. The SERVQUAL dimensions were based on an established service quality framework. The questionnaire was reviewed to ensure the relevance and clarity of the statements within the context of Kabil Port services.

Data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0 software. This method was selected because it is suitable for testing complex relationships involving mediating variables and does not require the assumption of multivariate normality. The measurement model was evaluated based on convergent validity, reliability, and discriminant validity. The structural model was assessed through collinearity analysis, the coefficient of determination (R^2), predictive relevance (Q^2), and hypothesis testing. Hypothesis significance was evaluated using a bootstrapping technique with 3,000 subsamples at a 5% significance level.

RESEARCH RESULTS AND DISCUSSION

RESULTS

Characteristics Respondents

The characteristics of the research respondents are presented in Table 1.

Table 1
Characteristics Respondents (n = 394)

Characteristics	Category	f	%	Category	%
Position	Manager/GM	109	22	Board of Directors	7
	Staff	95	8	Supervisor	17
Years of service	>5-10 years	168	27	>2-5 years	31
Duration of use service	6 months - 2 years	179	29	>5 years	22
Service dominant	Goods services	119	14	Land services	23

Source : *Processed primary data (2026)*

As much as 56.1 percent respondents occupy position directors , managers , or supervisors, while 84.7 percent have a work period of more than two years . Composition This show that respondents own knowledge adequate For evaluate quality service harbor .

Evaluation of Measurement Model

All over indicator has an outer loading above 0.70 with mark the lowest is 0.702 on the assurance indicator and the highest is 0.839 on the indicator satisfaction , all of it significant at the level One percent . The results of the reliability and convergent validity tests are presented in Table 2.

Table 2
Reliability and Average Variance Extracted

Variables	Cronbach's α	rho_A	Composite Reliability	AVE
Tangible (X1)	0.876	0.879	0.904	0.585
Reliability (X2)	0.839	0.841	0.886	0.608
Responsiveness (X3)	0.849	0.850	0.893	0.626
Assurance (X4)	0.854	0.858	0.892	0.579
Empathy (X5)	0.864	0.866	0.898	0.595
Trust (Z)	1,000	1,000	1,000	1,000
Customer Satisfaction (Y)	0.775	0.775	0.870	0.690

Source : SmartPLS 4.0 data processing results (2026)

All over variables fulfil criteria reliability with Cronbach's Alpha, rho_A , and composite reliability above 0.70 , and fulfil validity convergent with AVE above 0.50. Validity test results discriminant with The Fornell-Larcker criteria are presented in Table 3.

Table 3
Fornell-Larcker criteria

Variables	X1	X2	X3	X4	X5	Z	Y
X1	0.765						
X2	0.862	0.780					
X3	0.861	0.893	0.791				
X4	0.857	0.847	0.860	0.761			
X5	0.847	0.876	0.891	0.886	0.771		
Z	0.648	0.668	0.665	0.677	0.673	1,000	
Y	0.795	0.825	0.822	0.857	0.867	0.642	0.831

Note: The diagonal value is the square root of AVE. Source : SmartPLS 4.0 data processing results (2026)

Table 3 shows that root squared AVE of each dimensions quality service more small than the correlation with other dimensions . The interdimensional HTMT values were all above 0.95 and some exceeded 1.00, exceeding the 0.90 threshold recommended by Henseler, Ringle, and Sarstedt (2015). Thus, interdimensional discriminant validity has not been met. This finding is discussed further in section 4.5 and is a major limitation of this study.

Structural Model Evaluation

The collinearity test shows that the VIF values between dimensions range from 5.330 to 7.685, exceeding the ideal limit of 3.00. The coefficient of determination shows that the five dimensions explain 49.8 percent of the variation in trust and together with trust explain 79.4

percent of the variation in customer satisfaction. The Q Square values of 0.468 and 0.531 indicate good predictive relevance, while the SRMR of 0.057 is below the threshold of 0.08.

Testing Hypothesis

Table 4

Test Results Influence Direct

Connection	β	STDEV	T-Stat	P-Value	Conclusion
X1 $\rightarrow$ Z	0.074	0.115	0.642	0.521	Rejected
X2 $\rightarrow$ Z	0.162	0.123	1,311	0.190	Rejected
X3 $\rightarrow$ Z	0.122	0.132	0.925	0.355	Rejected
X4 $\rightarrow$ Z	0.254	0.114	2,218	0.027	Accepted
X5 $\rightarrow$ Z	0.132	0.124	1,069	0.285	Rejected
X1 $\rightarrow$ Y	0.013	0.064	0.202	0.840	Rejected
X2 $\rightarrow$ Y	0.105	0.068	1,556	0.120	Rejected
X3 $\rightarrow$ Y	0.059	0.076	0.773	0.439	Rejected
X4 $\rightarrow$ Y	0.343	0.100	3,434	0.001	Accepted
X5 $\rightarrow$ Y	0.382	0.082	4,681	0,000	Accepted
Z $\rightarrow$ Y	0.035	0.042	0.839	0.401	Rejected

Source : SmartPLS 4.0 data processing results with 3,000 subsamples (2026)

Based on Table 4, only three from eleven connection significant direct impact , namely assurance of trust , assurance of customer satisfaction, and empathy towards customer satisfaction. The test results influence No direct presented in Table 5.

Table 5

Test Results Indirect Influence

Indirect Path	β	T-Stat	P-Value	CI 95%
X1 $\rightarrow$ Z $\rightarrow$ Y	0.003	0.383	0.701	-0.010 – 0.018
X2 $\rightarrow$ Z $\rightarrow$ Y	0.006	0.609	0.543	-0.010 – 0.029
X3 $\rightarrow$ Z $\rightarrow$ Y	0.004	0.517	0.605	-0.009 – 0.025
X4 $\rightarrow$ Z $\rightarrow$ Y	0.009	0.781	0.435	-0.017 – 0.031
X5 $\rightarrow$ Z $\rightarrow$ Y	0.005	0.530	0.596	-0.010 – 0.027

Source : SmartPLS 4.0 data processing results (2026)

All over track mediation No significant with hose beliefs that include zero . Referring to the typology of Zhao, Lynch, and Chen (2010), the relationship between assurance and empathy is categorized as as direct-only nonmediation , whereas in three dimensions other as no-effect nonmediation .

Model Robustness Test

Remember height collinearity interdimensional , done testing repeat with treat quality service as construct aggregate measured by all 29 indicators . A comparison of the two models is presented in Table 6.

Table 6
Comparison of Dimensional Model and Aggregate Model

Criteria	Dimension Model	Aggregate Model	Information
β quality service $\rightarrow$ Y	0.013 – 0.382	0.849	Aggregate more stable
β quality service $\rightarrow$ Z	0.074 – 0.254	0.704	Aggregate more stable
β Z $\rightarrow$ Y	0.035 (p=0.401)	0.045 (p=0.298)	You're welcome No significant
Effect mediation	Not significant	Not significant	Conclusion consistent
R ² Y	0.794	0.777	Equivalent
Maximum VIF	7,685	1,983	Aggregate free collinearity

Source : SmartPLS 4.0 data processing results (2026)

Table 6 shows that conclusion about the role of trust is consistent in both models, namely trust does not influential significant to satisfaction and not mediate connection quality service with satisfaction . On the other hand , the coefficient track dimensions quality services vary greatly in dimension model and become stable in the aggregate model , with maximum VIF value down from 7,685 to 1,983. This is confirm that difference significance interdimensional in Table 4 is influenced by collinearity.

DISCUSSION

Dominance of empathy and assurance as determinant satisfaction in line with characteristics users service ports that are Corporate . Service users interact repeatedly with the same officers and require handling tailored to cargo characteristics, ship schedules, and document requirements. At ports serving high-value liquid bulk cargo, cargo security assurance and officer competence are also key considerations, in line with Chang and Thai's (2016) findings regarding the importance of port security quality to customer satisfaction.

The insignificance of tangible, reliability, and responsiveness is consistent with Yeo et al. (2015), who also found that not all port service quality factors had a significant effect when tested together. However, the results of the model's robustness test indicate that this insignificance reflects measurement overlap rather than a lack of relationship, given that the bivariate correlations between the three dimensions and satisfaction ranged from 0.795 to

0.825. Therefore, this finding cannot be interpreted as a recommendation to ignore the physical and reliability aspects of service.

The lack of trust as a mediator is supported by Fardan et al. (2026), who found similar results in courier services. Theoretically, trust is future-oriented and more related to loyalty and long-term commitment, while satisfaction is an evaluation of recent experiences. In port services with high technical engagement, user decisions are more determined by operational considerations than relational relationships.

An interesting finding is the difference in the mechanisms by which satisfaction and trust are formed. Empathy is the strongest. form satisfaction but No significant forming trust, while assurance is significant in both . This indicates that satisfaction more influenced quality personal interaction , whereas trust more influenced guarantee competencies that are institutional findings This complementing the commitment-trust theory with show that dimensions quality service No contribute The same to formation trust .

CONCLUSION

Kabil Port Batam, with coefficients of 0.382 and 0.343 respectively. Assurance is the only one influential dimensions significant towards trust. Tangible, reliability, and responsiveness are not influential significant in the model, although all three correlated strong with satisfaction in a way bivariate . Trust does not influential significant towards customer satisfaction and not mediate influence single dimension quality service .

In a way practical , manager harbor recommended prioritize strengthening aspect personal attention through appointment officer connector still for every company users services , as well as strengthen guarantee security content and competency officer . Aspect physical and reliability service still need maintained as prerequisite base .

Study This own limitations . First , validity discriminant interdimensional quality service No fulfilled and collinearity interdimensional classified as high , so that coefficient track each dimensions need interpreted in a way be careful . Second , trust is measured with indicator single so that reliability the construction No can tested and estimated effect mediation tend depressed . Third , research nature cut latitude on one harbor so that generalization limited . Research furthermore recommended measure trust with at least three items that reflect ability, benevolence, and integrity, formulate repeat grains each dimensions to be more differentiated , and place trust as intermediary going to loyalty or commitment partnership.

Citations And References

- Chang, C. H., & Thai, V. V. (2016). Do port security quality and service quality influence customer satisfaction and loyalty? *Maritime Policy & Management*, 43(6), 720-736. <https://doi.org/10.1080/03088839.2016.1151086>
- Fardan, MKF, Mardhotillah, RR, Chusnaini, A., & Rasyid, RA (2026). Trust as a mediator between service quality and customer satisfaction: Evidence from courier services in Surabaya and Sidoarjo. *Journal Management and Innovation (MANOVA)*, 9(1), 55-67. <https://doi.org/10.15642/manova.v9i1.2320>
- Hair, J.F., Hult, G.T.M., Ringle, C.M., & Sarstedt, M. (2022). *A primer on partial least squares structural equation modeling (PLS-SEM)* (3rd ed.). Sage Publications. <https://doi.org/10.1007/978-3-030-80519-7>
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115-135. <https://doi.org/10.1007/s11747-014-0403-8>
- Le, D.N., Nguyen, H.T., & Truong, P.H. (2020). Port logistics service quality and customer satisfaction: Empirical evidence from Vietnam. *The Asian Journal of Shipping and Logistics*, 36(2), 89-103. <https://doi.org/10.1016/j.ajsl.2019.10.003>
- Morgan, R. M., & Hunt, S. D. (1994). The commitment-trust theory of relationship marketing. *Journal of Marketing*, 58(3), 20-38. <https://doi.org/10.1177/002224299405800302>
- Oliver, R.L. (1980). A cognitive model of the antecedents and consequences of satisfaction decisions. *Journal of Marketing Research*, 17(4), 460-469. <https://doi.org/10.1177/002224378001700405>
- Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988). SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. *Journal of Retailing*, 64(1), 12-40.
- Thai, V. V. (2016). The impact of port service quality on customer satisfaction: The case of Singapore. *Maritime Economics & Logistics*, 18(4), 458-475. <https://doi.org/10.1057/mel.2015.19>
- Yeo, GT, Thai, VV, & Roh, SY (2015). An analysis of port service quality and customer satisfaction: The case of Korean container ports. *The Asian Journal of Shipping and Logistics*, 31(4), 437-447. <https://doi.org/10.1016/j.ajsl.2016.01.002>
- Zhao, X., Lynch, J. G., & Chen, Q. (2010). Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *Journal of Consumer Research*, 37(2), 197-206. <https://doi.org/10.1086/651257>