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# DETERMINANTS OF AIR LOGISTICS SERVICE QUALITY AND THEIR IMPLICATIONS FOR THE PERFORMANCE OF AIR EXPORT COMPANIES IN BALI

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## Abstract

Globalization and international trade require fast and efficient logistics systems, with air logistics playing a strategic role in handling high-value and time-sensitive commodities. In Indonesia, particularly Bali as a major air export hub, heavy reliance on air transportation has not been matched by improvements in logistics service quality and efficiency, as reflected in high costs, regulatory complexity, limited facilities, and weak customer relationships. This study examines the effects of capabilities, operational performance, regulations, customer relationships, and costs on air logistics service quality and their implications for the performance of air export firms in Bali. A confirmatory quantitative approach using SEM-PLS was applied to data from 245 respondents. The findings show that these factors significantly influence air logistics service quality, which in turn positively affects firm performance and serves as a mediating variable. These results highlight the strategic importance of service quality in enhancing air export competitiveness.

**Keywords:** Air Export Logistics, Logistics Service Quality, Export Firm Performance, Logistics Service Determinants, SEM-PLS

## INTRODUCTION

Globalization and international trade demand logistics systems that are fast, efficient, and well integrated, in which air logistics plays a strategic role for high-value, perishable, and time-sensitive commodities (Filip et al., 2025). Although it accounts for only about 1% of global cargo volume, air logistics contributes approximately 35% of the total value of world trade, equivalent to USD 7.5 trillion annually (IATA, 2025). The use of digital technologies like blockchain, e-logistics, and the Internet of Things, which improve operational efficiency and transparency, has further enhanced this position (Kuteyi & Winkler, 2022; Praba & Mashudi, 2024). The Asia–Pacific region has emerged as the primary growth hub, contributing more than 50% of the increase in international cargo tonne kilometers (IATA, 2024; UNCTAD, 2023).

The growth of global air logistics has a direct impact on developing countries, including Indonesia, which relies on air transport as a vital mode of distribution. However, national logistics performance continues to face structural challenges. The Logistics Performance Index indicates that Indonesia's ranking declined from 46th in 2018 to 63rd in 2023, with a score of 3.0, primarily due to weak performance in customs and infrastructure (WorldBank, 2023). In addition, national logistics costs remain high, accounting for approximately 22–23% of GDP, significantly above the averages of Malaysia (±13%) and Thailand (±14%), thereby undermining supply chain efficiency and the competitiveness of exporters (Chakrabartty & Sinha, 2022; Jasim, 2024). These conditions have contributed to the slowdown in Indonesia's non-oil and gas export growth, which declined from 9.2% in 2021 to 3.8% in 2023 (Binarti & Subandi, 2023; Grzelakowski, 2024).

Despite these structural challenges, Indonesia's air logistics sector continues to demonstrate positive prospects. Data from (BPS, 2024) indicate an increase in air cargo volume, reaching 312.5 thousand tons in the first half of 2024, representing a growth of 7.31% compared to the previous period. This increase has been driven by exports of leading commodities such as agribusiness products, fisheries, and manufactured goods (Bui, 2025). However, the rise in cargo volume has not been accompanied by improvements in service quality and structural efficiency, particularly in regions with a high dependence on air transport such as Bali, which has experienced a 6.8% decline in export growth over the past two years (Andi & Nainggolan, 2025; Jasim, 2024).

As a center of the creative economy and exports in Eastern Indonesia, Bali recorded non-oil and gas export values of approximately USD 600 million in 2024, with leading commodities including fresh fisheries products, handicrafts, culturally based fashion, and processed food products (BPS, 2025). I Gusti Ngurah Rai International Airport functions as the main hub for air export activities in Bali; therefore, the high level of dependence on air transportation necessitates the provision of reliable, fast, and high-quality air logistics services to ensure smooth distribution and maintain export competitiveness.

Despite the continued growth of Bali's export potential, increases in cargo volume have not been accompanied by adequate efficiency in air logistics operations. Various constraints persist, including limited facilities, high operational costs, delays in export documentation, suboptimal customer relationship management, and the complexity of customs regulations (Kuteyi & Winkler, 2022; Praba & Mashudi, 2024). Inadequate facilities have the potential to reduce the quality of fisheries products by up to 30% (FAO, 2022), while complex customs procedures can extend clearance times by up to 48 hours and increase export costs by approximately 15%. As a result, an average

of 150 shipment delay cases are recorded annually, and more than 10% of exporters have reported complaints related to the quality of air logistics services (Wiguna, 2024). These conditions reflect a gap between service expectations and actual performance, which directly affects export outcomes. Therefore, in the context of Bali's air export operations, empirical study is necessary to methodically determine the major factors of air logistics service quality.

Studies based on a Systematic Literature Review identify service capability, operational performance, regulatory, customer relationships, and cost as the main determinants of international logistics service quality (Candra et al., 2025). However, prior research has generally examined these factors in a fragmented manner, focusing separately on aspects such as transportation infrastructure (Senquiz-Diaz, 2021), cargo terminal service quality (Abimanyu et al., 2023), or the impact of logistics performance on exports without incorporating regulatory dimensions and the mediating role of service quality (Lhassan et al., 2022). Moreover, empirical findings remain inconsistent: while some studies report significant positive effects on service quality and firm performance (Adeolu et al., 2025), others reveal context-dependent and statistically insignificant results, including in the relationship between logistics service quality and firm performance (Akoğlu et al., 2022; Nguyen & Vo, 2024). Methodological limitations also persist, as existing studies predominantly focus on maritime and land-based logistics (Karina et al., 2024; Lhassan et al., 2022) and rely on confirmatory approaches that test only direct relationships between variables (Praba & Mashudi, 2024; Shoffiyati et al., 2025). These conditions underscore the presence of theoretical, empirical, and methodological gaps, as well as the need for an integrative predictive model capable of simultaneously capturing complex interrelationships among variables within the context of export-oriented air logistics in Bali.

This study offers novelty by confirmatorily testing an integrative model that links firm capabilities, operational performance, regulatory factors, customer relationships, and cost structures in shaping logistics service quality and its implications for the performance of air-exporting firms. Unlike prior studies that have examined these factors in isolation, this research positions logistics service quality as a mediating variable to explain how internal resources, external conditions, and relational aspects are translated into competitive advantage and enhanced firm performance. Theoretically, the study is grounded in the Resource-Based View and Operational Performance Theory, which emphasize the role of capabilities and operational efficiency as sources of internal advantage; Regulatory Theory and Cost Efficiency Theory, which explain the influence of regulations and costs as external determinants; and Customer Relationship Theory and SERVQUAL, which highlight customer relationships and service quality as critical relational elements. These theoretical perspectives are integrated within Firm Performance Theory, which posits that the synergy among internal, external, and relational factors is ultimately reflected in improved firm performance. Accordingly, this study not only confirms the interrelationships among variables within a comprehensive theoretical framework but also strengthens the empirical validity of these theories in the context of export-oriented air logistics in Bali.

To examine these complex relationships, this study employs Structural Equation Modeling–Partial Least Squares (SEM-PLS), which is particularly appropriate due to its ability to capture non-linear relationships and to evaluate models using data that do not follow a normal distribution (Hair et al., 2021). Through this approach, the study is able

to simultaneously test an integrative mechanism that explains the effects of internal, external, and relational factors on air logistics service quality and its implications for the performance of air-exporting firms in Bali.

Based on these considerations, the objectives of this study are to examine the effects of firm capabilities, operational performance, regulatory factors, customer relationships, and cost structures on air logistics service quality, with service quality serving as a mediating variable in its relationship with export firm performance. Theoretically, this study contributes to the literature on air logistics service management, which remains limited in the Indonesian context, particularly in Bali. Practically, the findings are expected to provide valuable insights for policymakers and industry stakeholders in strengthening Bali's export competitiveness through regulatory efficiency, the enhancement of logistics human resources, and service digitalization.

## REVIEW OF LITERATURE

### Capabilities in Air Logistics

Air logistics capabilities constitute strategic resources according to the Resource-Based View (RBV), whereby resources that are valuable, rare, difficult to imitate, and irreplaceable create competitive advantage. In air-exporting firms in Bali, these capabilities are reflected in human resource competencies, technology, infrastructure, and operational processes (Jegan et al., 2024). Competent human resources ensure the accuracy of cargo management, while technologies such as the Internet of Things and automation enhance supply chain visibility and service efficiency (Spandonidis et al., 2022). Modern infrastructure, including warehouse facilities and ground handling equipment, supports timely delivery and reduces the risk of cargo damage (Bunahri, 2023). Well-managed internal capabilities strengthen service quality and the firm's responsiveness to global market dynamics, consistent with RBV principles that emphasize unique capabilities as key determinants of competitive advantage (Faqihah et al., 2025; Li et al., 2024).

### Operational Performance in Air Logistics

Operational Performance Theory emphasizes that operational performance is the outcome of efficiently and reliably managed processes. Performance indicators include speed, accuracy, reliability, throughput, and efficiency, reflecting the operational system's ability to respond to market demands and competitive pressures (Jurgelane-Kaldava et al., 2025). Cargo handling processes, encompassing picking, inspection, storage, and delivery, require coordination across organizational units to ensure smooth workflow. Digitalization and technological innovations, such as automation, artificial intelligence, and data-driven decision making, enhance operational precision, accelerate throughput, and reduce errors (Başal et al., 2025). Improvements in operational capabilities have been shown to support competitive advantage, particularly for international exporting firms (Suvorova et al., 2025).

### Regulations in Air Logistics

Regulations play a strategic role in maintaining operational safety, efficiency, and standardization, as explained by Regulatory Theory. Institutions such as the International Civil Aviation Organization (ICAO), International Air Transport Association (IATA), the Indonesian Ministry of Transportation, and Customs authorities establish standards for safety, security, documentation, and inspection procedures (Farooqui, 2025; Ginting et al., 2025). Compliance with regulations helps reduce operational risks and enhances supply chain efficiency; however, regulatory

complexity can impose burdens on firms. Mitigation strategies through coordination with authorities, human resource training, and digitalization of documentation have been shown to improve operational resilience and consistency (Utami et al., 2024). Thus, regulations function not only as a control mechanism but also as a strategic factor influencing firm performance and competitiveness.

**Customer Relationships in Air Logistics**

Customer Relationship Management (CRM) Theory states that, customer relationship management constitutes a strategic component that enhances satisfaction, loyalty, and long-term value. Relationship quality is built through communication, trust, responsiveness, problem-solving, and complaint handling (Yildiz, 2021). CRM technologies, such as cargo tracking systems and automated notifications, improve transparency and operational responsiveness (Kim & Kim, 2021). Effective customer relationships foster loyalty and repeat transactions, thereby supporting the competitive advantage of air-exporting firms. Integrating customer feedback into service improvement processes further strengthens these relationships and continuously enhances service quality (Nasution, 2024; Rasiah et al., 2021).

**Cost in Air Logistics**

Cost structure constitutes a critical element affecting organizational competitiveness and performance, as explained by Cost Efficiency Theory. Costs associated with cargo handling, transportation, security, storage, and documentation influence pricing strategies and investment priorities (Kibirige et al., 2021). Cost efficiency is achieved through productivity improvements, digitalization, and process optimization, rather than through service reductions that compromise quality. Real-time tracking technologies, automation, and document digitalization help minimize delay-related costs and enhance accuracy, thereby strengthening supply chain reliability and competitive advantage (Jurgelane-Kaldava et al., 2025).

**Air Logistics Service Quality**

SERVQUAL Theory emphasizes service quality through five dimensions: reliability, assurance, responsiveness, tangibles, and empathy, which are particularly relevant for air logistics services that demand high timeliness and accuracy (Praba & Mashudi, 2024). Logistics Service Quality (LSQ) Theory highlights specific characteristics, such as on-time delivery, condition of goods, information accuracy, and complaint handling capabilities. The implementation of digital tracking technologies enhances information visibility, strengthens trust, and supports high perceptions of service (Adenigbo et al., 2023). Integrating SERVQUAL and LSQ provides a comprehensive understanding of service quality and its impact on customer satisfaction and loyalty (Meo et al., 2021).

**Air Export Firm Performance**

The performance of air-exporting firms reflects the effectiveness of strategies, logistics efficiency, and the ability to meet global market demands. Logistics capabilities, optimized processes, and high-quality services have a direct impact on financial performance and competitiveness (Adeolu et al., 2025; Jasim, 2024). The Resource-Based View (RBV) emphasizes unique capabilities, such as digital tracking systems and decision-support systems, as sources of competitive advantage. Firm Performance Theory asserts that internal efficiency, operational innovation, and customer satisfaction are primary determinants of long-term performance (Rinjani, 2025). Furthermore, service quality, as conceptualized by SERVQUAL, mediates the

effect of capabilities on performance, as reliable and responsive services create customer value and enhance the profitability of air-exporting firms (Kankam, 2023).

## RESEARCH METHOD

### Research Design

This study adopts a confirmatory quantitative approach to examine the causal relationships among capabilities, operational performance, regulations, customer relationships, and costs on air logistics service quality and their implications for the performance of air export firms in Bali. A cross-sectional survey design is employed, with data collected at a single point in time using a structured questionnaire.

### Research Model and Hypotheses

The research model examines the direct effects of independent variables, capabilities, operational performance, regulations, customer relationships, and costs on air logistics service quality and air export firm performance. In addition, air logistics service quality is tested as a mediating variable that transmits the effects of the independent variables on firm performance.

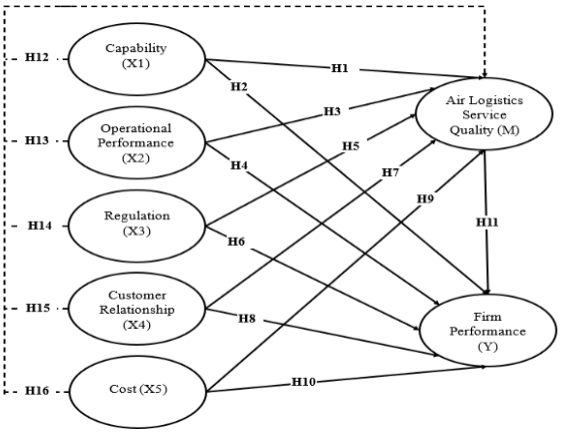


**Figure 1**
**Conceptual Framework**

Based on a review of the literature and previous studies, the hypotheses proposed in this study are as follows:

- H1: Capabilities have a direct and positive influence on the quality of air logistics services.
- H2: Capabilities have a direct and positive effect on the performance of air export companies.
- H3: Operational performance has a direct and positive effect on air logistics service quality.
- H4: Operational performance has a direct and positive effect on the performance of air export companies.
- H5: Regulations have a direct and positive influence on the quality of air logistics services.
- H6: Regulations have a direct and positive influence on the performance of air export companies.

- H7: Customer relations have a direct and positive impact on the quality of air logistics services.
- H8: Customer relations have a direct and positive impact on the performance of air export companies.
- H9: Costs have a direct and positive impact on the quality of air logistics services.
- H10: Costs have a direct and positive influence on the performance of air export companies.
- H11: The quality of air logistics services has a direct and positive impact on the performance of air export companies.
- H12: Capability has a direct and positive influence on the performance of air export companies through the quality of air logistics services.
- H13: Operational performance has a direct and positive influence on the performance of air export companies through the quality of air logistics services.
- H14: Regulations have a direct and positive influence on the performance of air export companies through the quality of air logistics services.
- H15: Customer relations have a direct and positive influence on the performance of air export companies through the quality of air logistics services.
- H16: Costs have a direct and positive influence on the performance of air export companies through the quality of air logistics services.

**Population and Sample**

The population of this study comprises air export companies and service providers in Bali, with individuals directly involved in export management through I Gusti Ngurah Rai International Airport as the unit of analysis. The sample was selected using purposive sampling, including respondents with at least one year of experience in air export logistics (Hair et al., 2021). Sample size determination followed SEM-PLS guidelines of 5–10 times the number of indicators; applying a moderate ratio of seven to 35 indicators resulted in 245 respondents, which is sufficient for stable estimation.

**Data Collection**

Primary data were gathered using a five-point Likert scale questionnaire developed from established theories and earlier research in the context of air export logistics in Bali. The operational definitions and indications for each variable are given in Table 1.

**Table 1**
**Operational Definitions of Variables and Indicators**

| Variable | Operational Definition | Indicators |
|---|---|---|
| Capabilities (X1) (Hussein & Song, 2025) | Internal capabilities of air exporting firms in supporting logistics operations | 1. Human resource capabilities<br>2. Technology<br>3. Infrastructure and facilities<br>4. Managerial capabilities<br>5. Adaptability |
| Operational Performance (X2) (İlbaş & Kaya, 2025) | Level of efficiency and effectiveness of internal processes in air export operations | 1. Delivery timeliness<br>2. Operational reliability<br>3. Speed of service<br>4. Operational flexibility<br>5. Operational productivity |
| Regulations (X3) | Level of compliance and | 1. Regulatory compliance |

| Variable | Operational Definition | Indicators |
|---|---|---|
| (Wang'ombe, 2024) | support for regulations affecting the smoothness of air exports | 2. Policy clarity<br>3. Administrative efficiency<br>4. Government support<br>5. Inter-agency coordination |
| Customer Relationships (X4) (Bupu et al., 2023) | Quality of interaction and relations between air logistics service providers and exporters in the context of air exports. | 1. Communication and information<br>2. Complaint Handling<br>3. Attention to customer needs<br>4. Quality of personal interactions<br>5. Customer trust and loyalty |
| Cost (X5) (Kibirige et al., 2021) | Efficiency in managing air logistics costs related to export activities | 1. Operational cost efficiency<br>2. Ratio of logistics costs to total exports<br>3. Resource optimization<br>4. Ability to control additional costs<br>5. Service rate affordability |
| Air Logistics Service Quality (M) (Yang et al., 2024) | Level of meeting customer expectations in air export services | 1. *Reliability*<br>2. *Responsiveness*<br>3. *Assurance*<br>4. *Empathy*<br>5. *Tangibles* |
| Air Export Firm Performance (Y) (Anwar et al., 2025) | Overall firm performance in export activities | 1. Export operational performance<br>2. Financial performance<br>3. Export market performance<br>4. Customer performance<br>5. Sustainability performance |

Source: Author's Analysis, 2025

**Data Analysis**

The data were analyzed by SEM-PLS, which is appropriate for complicated research models with reflected indicators and limited sample sizes (Hair et al., 2021). The analysis was carried out in two steps. The first stage involved evaluating the measurement model (outer model), which included assessing convergent validity through factor loadings (> 0.70) and Average Variance Extracted (AVE > 0.50), discriminant validity using the Fornell-Larcker criterion and cross-loadings, and construct reliability through composite reliability and Cronbach's alpha (> 0.70). In the second stage, the structural model (inner model) was evaluated using coefficient of determination ($R^2$), t-statistics, and p-values to test latent variable correlations. Statistically significant relationships were defined as $t > 1.65$ and $p < 0.05$.

## RESULTS AND DISCUSSION

### Outer Structural Model

Table 2 shows that all indicators meet convergent validity standards, with factor loadings ≥ 0.70 and AVE > 0.50, indicating a reliable foundation for evaluating the measurement model.

**Table 2**
**Results of Construct Validity and Reliability Assessment**

| Variable | FL | Crb_α | Cps_Re | AVE |
|---|---|---|---|---|
| **Capabilities (X1)** | | 0,823 | 0,876 | 0,586 |
| **X1.1** | 0,713 | | | |
| **X1.2** | 0,792 | | | |
| **X1.3** | 0,793 | | | |
| **X1.4** | 0,731 | | | |
| **X1.5** | 0,794 | | | |
| **Operational Performance (X2)** | | 0.831 | 0.881 | 0.597 |
| **X2.1** | 0,765 | | | |
| **X2.2** | 0,787 | | | |
| **X2.3** | 0,733 | | | |
| **X2.4** | 0,800 | | | |
| **X2.5** | 0,778 | | | |
| **Regulations (X3)** | | 0.847 | 0.891 | 0.621 |
| **X3.1** | 0,805 | | | |
| **X3.2** | 0,780 | | | |
| **X3.3** | 0,789 | | | |
| **X3.4** | 0,770 | | | |
| **X3.5** | 0,796 | | | |
| **Customer Relationships (X4)** | | 0.822 | 0.875 | 0.583 |
| **X4.1** | 0,788 | | | |
| **X4.2** | 0,745 | | | |
| **X4.3** | 0,778 | | | |
| **X4.4** | 0,748 | | | |
| **X4.5** | 0,758 | | | |
| **Cost (X5)** | | 0.827 | 0.878 | 0.592 |
| **X5.1** | 0,802 | | | |
| **X5.2** | 0,785 | | | |
| **X5.3** | 0,811 | | | |
| **X5.4** | 0,720 | | | |
| **X5.5** | 0,723 | | | |
| **Air Logistics Service Quality (M)** | | 0.841 | 0.887 | 0.613 |
| **M.1** | 0,820 | | | |
| **M.2** | 0,816 | | | |
| **M.3** | 0,725 | | | |
| **M.4** | 0,751 | | | |
| **M.5** | 0,797 | | | |
| **Air Export Firm Performance (Y)** | | 0.854 | 0.896 | 0.632 |
| **Y.1** | 0,765 | | | |
| **Y.2** | 0,819 | | | |
| **Y.3** | 0,798 | | | |
| **Y.4** | 0,763 | | | |
| **Y.5** | 0,828 | | | |

*Note: FL = Factor Loading; Crb_α = Cronbach alpha; Cps_Re = Composite Reliability*
Source: Results of SEM-PLS Processing, 2025

Table 3 confirms discriminant validity, as the square roots of the AVE values (according to the Fornell-Larcker criterion) exceed the correlations between latent constructs. Furthermore, the model passes reliability norms, with composite reliability and Cronbach's alpha values at or above the 0.70 level.

**Table 3**
**Result of the Fornell-Larcker Validity Test**

| | M | X1 | X2 | X3 | X4 | X5 | Y |
|---|---|---|---|---|---|---|---|
| **M** | 0,783 | | | | | | |
| **X1** | 0,655 | 0,765 | | | | | |
| **X2** | 0,665 | 0,575 | 0,773 | | | | |
| **X3** | 0,636 | 0,563 | 0,562 | 0,788 | | | |
| **X4** | 0,684 | 0,580 | 0,582 | 0,584 | 0,764 | | |
| **X5** | 0,655 | 0,529 | 0,573 | 0,551 | 0,573 | 0,769 | |
| **Y** | 0,759 | 0,701 | 0,669 | 0,675 | 0,696 | 0,675 | 0.795 |

Source: Results of SEM-PLS Processing, 2025

**Inner Structural Model**

In the evaluation of the inner model, three main criteria were considered: R-squared values, t-statistics, and p-values.

**Table 4**
**R-Squared Test Results**

| | R-Square | R-Square Adjusted |
|---|---|---|
| **Air Export Firm Performance (Y)** | 0.731 | 0.724 |
| **Air Logistics Service Quality (M)** | 0.665 | 0.658 |

Source: Results of SEM-PLS Processing, 2025

Based on the coefficient of determination ($R^2$) analysis, the air export firm performance variable (Y) has $R^2 = 0.731$ and adjusted $R^2 = 0.724$, indicating that 73.1% of the variance in performance is explained by the exogenous variables in the model. The air logistics service quality variable (M) has $R^2 = 0.665$ and adjusted $R^2 = 0.658$, reflecting moderate-to-strong explanatory power. The high $R^2$ and adjusted $R^2$ values, with minimal differences, indicate that the SEM-PLS model has good fit, strong explanatory power, and stability. Based on $t > 1.65$ and $p < 0.05$ (Table 5 & Figure 2), all hypotheses are supported, showing positive and significant direct and mediated relationships.

**Table 5**

**Hypothesis Testing Results**

| Hypothesis | B_P.c | O-SP | S_D | T_Stcs | P_VLE | Hpt_T.Co |
|---|---|---|---|---|---|---|
| **H1 : X1 -> Y** | 0,218 | 0,217 | 0,071 | 3,072 | 0,002 | Accepted |
| **H2 : X1 -> M** | 0,203 | 0,203 | 0,057 | 3,580 | 0,000 | Accepted |
| **H3 : X2 -> Y** | 0,121 | 0,125 | 0,061 | 1,977 | 0,048 | Accepted |
| **H4 : X2 -> M** | 0,203 | 0,199 | 0,068 | 2,974 | 0,003 | Accepted |
| **H5 : X3 -> Y** | 0,161 | 0,161 | 0,072 | 2,228 | 0,026 | Accepted |

| Hypothesis | B_P.c | O-SP | S_D | T_Stcs | P_VLE | Hpt_T.Co |
|---|---|---|---|---|---|---|
| **H6 : X3 -> M** | 0,153 | 0,157 | 0,063 | 2,442 | 0,015 | Accepted |
| **H7 : X4 -> Y** | 0,165 | 0,167 | 0,058 | 2,833 | 0,005 | Accepted |
| **H8 : X4 -> M** | 0,238 | 0,237 | 0,058 | 4,115 | 0,000 | Accepted |
| **H9 : X5 -> Y** | 0,170 | 0,171 | 0,058 | 2,947 | 0,003 | Accepted |
| **H10 : X5 -> M** | 0,210 | 0,208 | 0,066 | 3,207 | 0,001 | Accepted |
| **H11 : M -> Y** | 0,209 | 0,207 | 0,056 | 3,737 | 0,000 | Accepted |
| **H12 : X1 -> M -> Y** | 0,042 | 0,041 | 0,015 | 2,825 | 0,005 | Accepted |
| **H13 : X2 -> M -> Y** | 0,042 | 0,042 | 0,020 | 2,110 | 0,035 | Accepted |
| **H14 : X3 -> M -> Y** | 0,032 | 0,032 | 0,016 | 1,989 | 0,047 | Accepted |
| **H15 : X4 -> M -> Y** | 0,050 | 0,049 | 0,018 | 2,686 | 0,007 | Accepted |
| **H16 : X5 -> M -> Y** | 0,044 | 0,043 | 0,018 | 2,442 | 0,015 | Accepted |

*Note: Hpt = Hypothesis; β_P.c = Path-Coefficients O-SP = Original Sample; S_D = Standard Deviation; T_Scs = T-Statistics; P_VLE = P-Value; Hpt.T.Co = Hypothesis Testing Conclusion.*
Source: Results of SEM-PLS Processing, 2025

As illustrated in Figure 2, all indicators exhibit high factor loadings, generally above 0.70, and statistically significant t-values, confirming their validity in measuring the intended constructs.

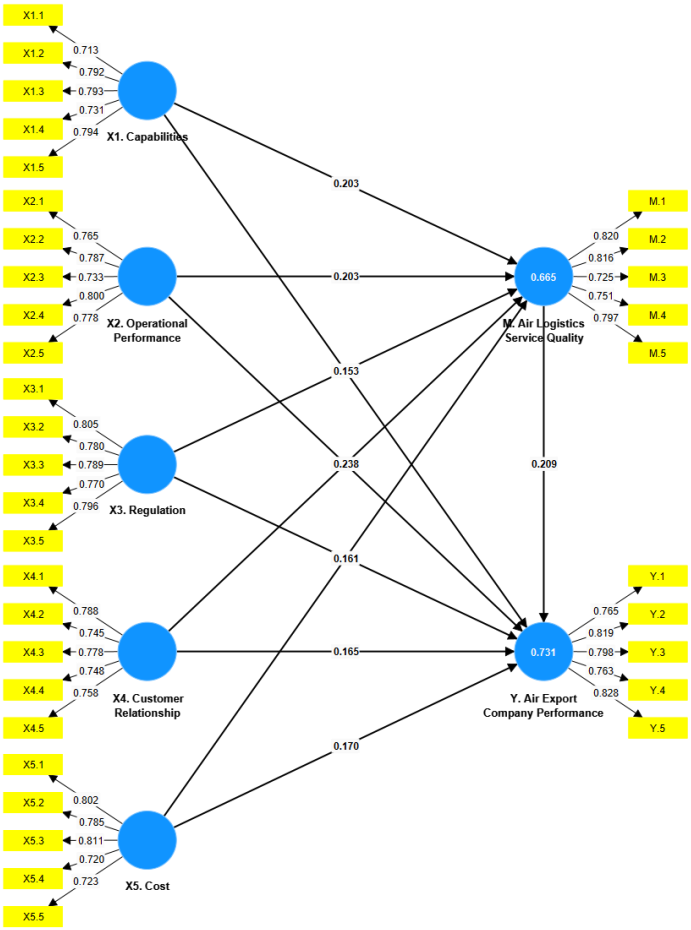


**Figure 2**
**Bootstrapping Test Results**

The findings for **H1** indicate that firm capabilities have a positive and significant effect on air logistics service quality in Bali. This result aligns with previous studies (Adeolu et al., 2025; Dovbischuk, 2025) emphasizing the crucial role of technological and operational capabilities in enhancing service quality. Theoretically, these findings support the Resource-Based View (RBV) and extend SERVQUAL and Logistics Service Quality theories by positioning capabilities as a primary antecedent of service quality. Practically, air-exporting firms are advised to strengthen human resource competencies and adopt digital logistics technologies to ensure service reliability and consistency.

The results for **H2** show that firm capabilities positively influence firm performance. This finding corroborates studies by (Adenigbo et al., 2023; Adeolu et al., 2025), which assert that technological and operational capabilities enhance competitive advantage and long-term performance. Theoretically, this result reinforces RBV and Firm Performance Theory. From a managerial perspective, firms should prioritize strategic investments in logistics capabilities to strengthen the competitiveness of Bali's air-export sector.

The findings for **H3** demonstrate that operational performance has a direct positive effect on service quality. This is consistent with prior research (Adeolu et al., 2025; Hussein & Song, 2025), which highlights that efficiency, speed, and accuracy improve service reliability. Theoretically, these results strengthen Operational Performance Theory and extend the application of SERVQUAL. Practically, air-exporting firms should enhance process efficiency, integrate operational technologies, and maintain high service standards.

The findings for **H4** indicate that operational performance has a positive effect on firm performance, consistent with previous research (Adeolu et al., 2025). This result confirms that operational excellence drives financial and market performance. Theoretically, these findings reinforce Operational Performance Theory and Firm Performance Theory, highlighting the critical role of process digitalization, standardization, and the strengthening of operational systems in managerial strategy.

The findings for **H5** indicate that regulations have a positive effect on service quality, consistent with previous studies (Farooqui, 2025). Compliance with regulations ensures procedural consistency, reliability, and service assurance. These findings extend Regulatory Theory and SERVQUAL by demonstrating that regulations function not only as a control mechanism but also as a driver of service quality. Firms are advised to enhance compliance, standardization, and digital documentation, while regulators are expected to maintain consistent regulatory frameworks.

The results for **H6** show that regulations positively influence firm performance, in line with prior research (Utami et al., 2024). Regulatory compliance reduces legal risks and enhances corporate reputation, thereby supporting Regulatory Theory and Firm Performance Theory. Managerial strategies should align with regulatory requirements, while government policies should ensure legal certainty so that regulations can serve as a performance driver.

The findings for **H7** demonstrate that customer relationships positively affect service quality. Studies (Kim & Kim, 2021; Nasution, 2024) indicate that trust, communication, and responsiveness improve service reliability. Theoretically, these results extend Customer Relationship Management (CRM) Theory and SERVQUAL applications. Practically, firms should strengthen CRM strategies, leverage customer data, and respond promptly to complaints.

The results for **H8** reveal that customer relationships positively influence firm performance, consistent with previous studies (Adeolu et al., 2025; Mukhtar et al., 2023). CRM contributes to loyalty, retention, and financial performance, thereby reinforcing CRM Theory and Firm Performance Theory. Firms are advised to invest in CRM systems and implement long-term customer relationship policies.

The findings for **H9** indicate that cost has a positive effect on service quality, consistent with prior studies (Adeolu et al., 2025; Praba & Mashudi, 2024). Strategic allocation of costs toward technology, facilities, and human resources enhances service reliability. These results reinforce Cost Efficiency Theory and extend the application of SERVQUAL. Firms should optimize investments to maintain competitive service quality.

The results for **H10** show that cost positively influences firm performance, supporting previous findings (Jurgelane-Kaldava et al., 2025). Efficient cost management improves profitability and operational performance, thereby strengthening Cost Efficiency Theory and Firm Performance Theory. Firms are advised to implement cost-efficiency strategies supported by technology adoption.

The findings for **H11** demonstrate that service quality positively affects firm performance. This is consistent with prior research ((Kankam, 2023). Reliability, responsiveness, and service assurance drive customer satisfaction, loyalty, and financial performance, thereby reinforcing SERVQUAL and Firm Performance Theory. Firms should standardize processes, digitalize services, and develop service personnel competencies.

The results for **H12** indicate that firm capabilities have a positive and significant effect on air-exporting firm performance through air logistics service quality. This finding aligns with previous studies (Firdiansyah, 2025). Theoretically, it strengthens RBV by highlighting service quality as the mechanism through which capabilities are transformed into firm performance. Practically, firms should develop internal capabilities that directly enhance service quality.

The findings for **H13** indicate that operational performance has a positive and significant effect on firm performance through air logistics service quality. This result is consistent with previous studies (Adeolu et al., 2025; Praba & Mashudi, 2024). Theoretically, these findings support Operational Performance Theory by positioning service quality as the primary mediator in performance creation. Practically, management should integrate operational improvements with service standards.

The results for **H14** show that regulations positively and significantly influence firm performance through air logistics service quality. This finding aligns with prior research (Farooqui, 2025; Utami et al., 2024). Theoretically, these results reinforce Regulatory Theory by emphasizing regulations as a driver of service quality and firm performance. Practically, firms should strengthen compliance and process standardization, while policymakers need to maintain regulatory consistency.

The findings for **H15** demonstrate that customer relationships positively and significantly affect firm performance through air logistics service quality. This result is consistent with previous studies (Mukhtar et al., 2023; Nasution, 2024). Theoretically, these findings enrich CRM Theory by positioning service quality as the main pathway through which customer relationships influence performance. Practically, firms should optimize CRM strategies, communication, and complaint handling.

The results for **H16** indicate that cost has a positive and significant effect on firm performance through air logistics service quality. This finding aligns with prior

research (Praba & Mashudi, 2024). Theoretically, it supports Cost Efficiency Theory by emphasizing the mediating role of service quality. Practically, firms should manage costs strategically through efficiency improvements and digitalization without compromising service quality.

## CONCLUSION

This study concludes that capabilities, operational performance, regulations, customer relationships, and costs have a positive and significant effect on air logistics service quality and the performance of air export firms. Air logistics service quality also functions as a mediating variable that strengthens the effects of these factors on firm performance. The empirical findings confirm that capabilities, operational efficiency, cost management, regulatory compliance, and customer relationships only achieve optimal impact when integrated into the provision of reliable, timely, and competitive logistics services, thereby enhancing the competitiveness of firms in the air logistics industry.

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