THE INFLUENCE OF HALAL CERTIFICATION AND QUALITY CULTURE ON OPERATIONAL PERFORMANCE MEDIATED BY ISO 9001:2015 QMS IN AN EXPORT-IMPORT COMPANY

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Abstract. *This study aims to examine the influence of halal certification and quality culture on operational performance, with the ISO 9001:2015 quality management system serving as a mediating variable, using an export import company that located in Cikarang Industrial Estate as research object. A quantitative approach with a causal associative design was employed, involving a sample of 65 employees. Data were analyzed using Structural Equation Modeling (SEM) with the SmartPLS 4 software. The analysis included assessments of loading factors, average variance extracted (AVE), discriminant validity (using the Fornell - Larcker criterion), Cronbach's alpha, composite reliability, model fit, coefficient of determination (R^2), hypothesis testing, and effect size (f^2). The findings reveal that operational performance is more strongly and directly influenced by halal certification and quality culture than through the indirect path mediated by the ISO 9001:2015 quality management system. These results suggest that while the ISO system contributes positively, the direct effects of organizational culture and certification practices play a more substantial role. Based on these insights, it is recommended that the company reinforce its quality management system and cultivate a sustainable quality culture. Doing so may enhance operational consistency and improve overall quality performance.*

Keywords: *Halal Certification; ISO 9001:2015; Operational Performance; Quality Culture*

1. INTRODUCTION

Indonesia is a country with a Muslim-majority population, where the consumption of halal-certified products is a religious obligation. Consequently, halal certification has become essential in the food business for two main reasons: first, to comply with legal regulations; and second, to attract Muslim consumers who are increasingly aware of the importance of consuming products that adhere to Islamic law. All stages of production, from sourcing raw materials to final packaging, must comply with halal requirements for a product to be officially certified. This ensures the product is both safe and aligned with the religious values of consumers. According to (Santika, 2023) as cited in Databoks.com, in a report titled "Number of Halal-Certified Products (2020–2023)", the number of halal-certified products in Indonesia increased significantly—from 54,405 in 2020 to 315,668 in 2021, then surging to 704,989 in 2022, and reaching 1.43 million in 2023.

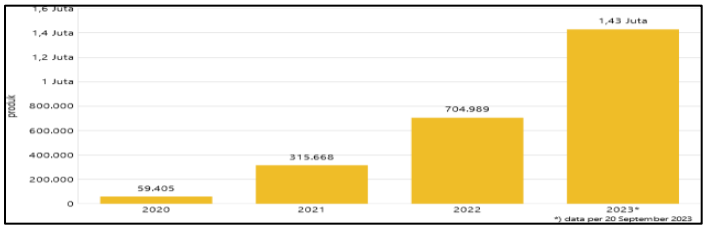

Figure 1. Number of Halal-Certified Products (2020–2023)
(Source: Databoks.com)

This indicates that such certification is believed to enhance consumer trust, expand market share, and contribute significantly to the company's operational performance. Beyond halal certification, the ability to maintain product quality also relies heavily on the presence of a strong quality culture. Consequently, quality culture becomes a vital element, as it represents a key characteristic every business must possess. It reflects the degree of excellence and quality in the goods and services produced.

Moreover, a quality culture demonstrates the collective commitment of both employees and management to deliver high-quality products and services, while actively engaging in continuous improvement initiatives. Nevertheless, such a culture cannot deliver optimal outcomes without the support of a structured system. In this context, the ISO 9001:2015 Quality Management System serves as a comprehensive framework that assists companies in systematically designing, implementing, and evaluating business processes to achieve consistent quality outcomes. ISO 9001:2015 goes beyond documentation and process control; it emphasizes a risk-based approach, the involvement of top management, and customer satisfaction as key indicators of the system's success.

One of the import-export companies located in the Delta Silicon industrial zone specializes in trading raw food ingredients for the food processing industry. The company imports a variety of food commodities such as peas, which are delivered in bulk form during warehouse unloading, and other ingredients like peanuts, coriander, peeled mung beans, rice, and sesame seeds, which are delivered in pre-packaged bags. Once the bulk commodities are unloaded, they undergo processing involving blowing, sieving, and sorting to remove impurities, dust, and to classify by size. This is followed by packaging before the products are either stored or directly distributed. Therefore, the company must ensure that all facilities and infrastructure — including the loading and unloading areas, storage spaces, processing units (blower/sieve/sortex), and packaging stations, as well as equipment such as forklifts and processing machines are maintained on a weekly and monthly basis. This regular maintenance helps prevent cross-contamination and ensures that product quality is preserved until it reaches the customer, thereby minimizing the risk of complaints and claims. Additionally, thorough inspection is required from the moment goods arrive at the facility until they are loaded onto delivery vehicles for distribution. This is particularly important as these commodities are generally intended for further processing by domestic food manufacturers.

At present, the company has implemented the ISO 9001:2015 Quality Management System. This system underscores a risk-based approach, customer focus, and continual improvement as its core principles. It enables the company to enhance efficiency, minimize nonconformities and waste, and strengthen control mechanisms — all of which contribute to improved operational performance. However, despite the structured processes in place, the company continues to face challenges related to product quality, as reflected in customer complaints and claims recorded in 2024, as shown in figure 2.

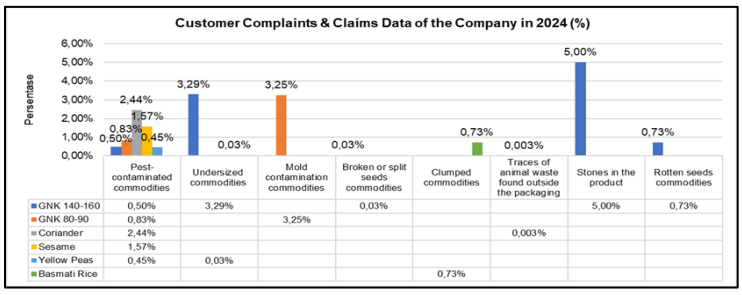

Figure 2. Customer Complaints and Claims of the company in 2024
(Source: Internal Data of Export-Import Company, 2024)

The graph above presents the percentage of commodities that were subject to complaints and claims in 2024. The highest reported issue was the presence of insects, accounting for 5.79% of the total cases. This figure is the sum of several commodities: 0.50% from (GNK 140-160), 0.83% from (GNK 80-90), 2.44% from coriander, 1.57% from sesame seeds, and 0.45% from yellow peas. The second most common issue was the presence of stones in the commodities, amounting to 5.00%, followed by undersized commodities in third place with 3.32%, derived from 3.29% of peeled mung beans (GNK 140-160) and 0.03% of yellow peas. The fourth issue was the presence of mold, accounting for 3.25%, followed by clumping and rotten seeds, both at 0.73%. The sixth issue was broken or split seeds, recorded at 0.03%, and finally, the lowest was the presence of animal waste outside the packaging, at 0.003%.

These issues suggest that during the processing stages (sieving/blowing/sorting), packaging, storage, or transportation of the commodities, there may have been lapses in employee diligence in maintaining quality standards. As a result, implementing halal certification becomes an important measure, especially for customers who require assurance of product quality and hygiene. The application of a quality culture in the company's operations also plays a vital role in ensuring that every stage of product handling is carried out in accordance with established standards.

Based on this phenomenon, it becomes essential to examine how halal certification and quality culture influence the company's operational performance, both directly and through the mediating role of the ISO 9001:2015 Quality Management System. Although this system has been implemented, discrepancies in product quality are still found in the field. This reveals a gap between quality system planning and the company's actual performance. Furthermore, there is still limited empirical research that investigates the mediating role of quality management systems in the food industry context, particularly in companies engaged in import-export of raw food materials.

In response to the identified quality issues and the limited previous studies, this research is designed to systematically address these problems. The objectives of this study are as follows: (1) to examine the effect of halal certification on the ISO 9001:2015 quality management system; (2) to assess the impact of quality culture on the ISO 9001:2015 quality management system in import-export companies; (3) to analyze the effect of halal certification on operational performance; (4) to determine the influence of the ISO 9001:2015 quality management system on operational performance; (5) to examine the effect of quality culture on operational performance; (6) to analyze whether halal certification affects operational performance through the mediation of the ISO 9001:2015 quality management system; and (7) to examine whether quality culture influences operational performance through the mediation of the ISO 9001:2015 quality management system.

2. LITERATURE REVIEW

2.1 Operational Performance (Y)

Operational performance focuses on the production of goods and services, as well as the use of specific methods and tools to address production-related issues—positioning it as a key area within management (Daft in Utami, 2022). According to Sobandi and Kosasih (Jusdijachlan et al., 2024:72) operational performance refers to the evaluation of a company's internal efficiency and effectiveness in terms of cost, customer service, product delivery, quality, continuity, and production processes. Prabowo and Jaya (Alam & Santosa, 2022) define it as what a business produces within a certain time frame based on predetermined criteria. Furthermore, Saputro & Amaruddin (2022) describe operational performance as a periodic assessment conducted by companies to ensure that their activities are effective and efficient in achieving organizational targets. In summary, operational performance reflects how well a company carries out its business activities, particularly in terms of producing goods or services. It is assessed based on how efficiently and effectively the company operates—evaluating costs, quality, customer service, timeliness, and continuity to

ensure the achievement of its objectives within a given period.

2.2 Halal Certification (X1)

Halal certification is an official written ruling (fatwa) issued by the Indonesian Ulema Council (MUI) confirming that a product is halal in accordance with Islamic law (Rasyid, 2020:151). Such certification provides assurance to Muslim consumers that the products they purchase comply with halal standards (Salam & Makhtum, 2022). Products that carry halal certificates are deemed to meet the criteria set by authorities and offer a guarantee of safety and religious compliance for both consumers and producers (Cholid, 2023). Thus, halal certification can be defined as the formal recognition of a product's halal status based on Islamic legal rulings and religious standards. It serves to ensure that the product is safe and permissible for Muslim consumption.

2.3 Quality Culture (X2)

Quality culture is considered an essential component that every company must possess, as it reflects the overall quality and integrity of the products or services offered, ultimately preserving the company's reputation in the eyes of customers (Huda et al., 2022). The principles, habits, and expectations that constitute a company's quality culture help establish an environment that promotes and values consistent high standards. The term "quality culture" refers to a set of norms and practices designed to ensure that products and services meet or exceed customer expectations and are continuously improved over time (Huda & Nurhidayati, 2020). Therefore, quality culture can be regarded as a foundational element that reflects a company's commitment to excellence. By embedding quality into everyday practices, the company is better positioned to maintain customer trust and long-term performance.

2.4 ISO 9001:2015 Quality Management System (Z)

The term "Quality Management System" (QMS) refers to a comprehensive framework encompassing an organization's structure, responsibilities, procedures, and resources related to quality management (Redi & Putra, 2021). The purpose of a QMS is to enhance competitiveness through continuous improvement, aligning with product conformity standards and customer focus while positioning quality as a core business strategy (Prasetyo et al., 2020). Based on a process approach and the PDCA (Plan-Do-Check-Act) cycle, this system aims to ensure consistency and ongoing improvement in product or service quality, as well as customer satisfaction. The ISO 9001:2015 standard also adheres to the seven principles of quality management: customer focus, leadership, engagement of people, process approach, continual improvement, evidence-based decision making, and relationship management with stakeholders (International Organization for Standardization, 2015:1-20).

3. RESEARCH METHODS

This study employs a quantitative research approach. According to Sugiyono, 2024:16-17), the aim of quantitative research is to test predefined hypotheses by examining a specific population or sample using research instruments and conducting statistical or quantitative analysis. As stated by (Sugiyono, 2024:65-66), this research seeks to investigate the causal relationships between independent variables (halal certification, quality culture, and ISO 9001:2015 quality management system) and the dependent variable (operational performance) using an associative approach, which explores relationships between two or more variables.

The research objectives are further supported by findings from prior studies, leading to the formulation of the following hypotheses; H1: Halal certification significantly influences ISO 9001:2015 2015 (Puspaningtyas & Sucipto, 2021); H2: Quality culture significantly influences ISO 9001:2015 (Huda & Nurhidayati, 2020); H3: Halal certification significantly influences operational performance (Amer, 2023); H4: ISO

9001:2015 significantly influences operational performance (Amaruddin et al., 2022); H5: Quality culture significantly influences operational performance (Huda et al., 2022); H6: ISO 9001:2015 mediates the effect of halal certification on operational performance (Puspaningtyas & Sucipto, 2021); H7: ISO 9001:2015 mediates the effect of quality culture on operational performance (Khalfan et al., 2022).

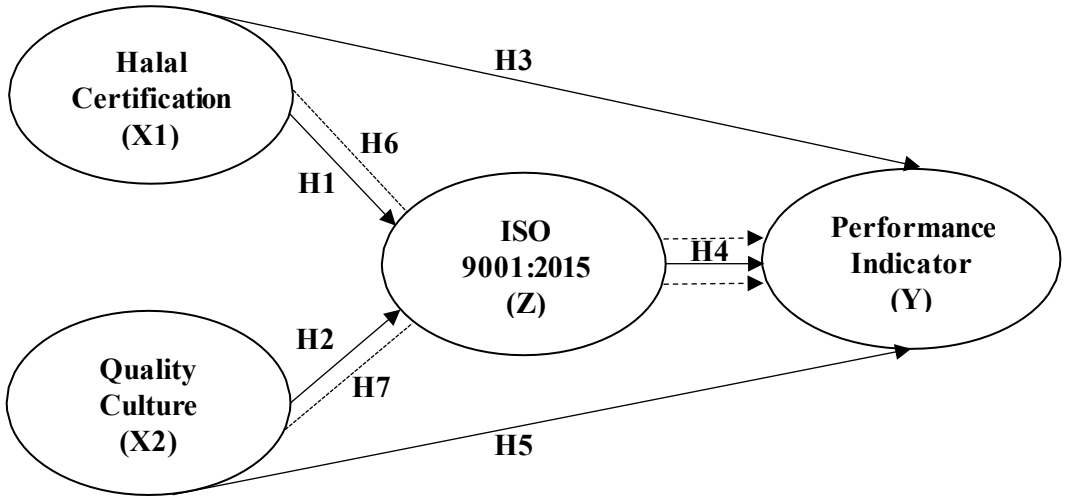

Figure 3. Hypothesis Model

The import-export company located in the Cikarang Industrial Estate is directly relevant to the research topic concerning halal certification, quality culture, and the ISO 9001:2015 quality management system. This location is considered ideal, as the company is subject to strict demands regarding product quality and halal compliance, making it a suitable object for examining the real and current interrelationships among these variables. The research period spans eight months, starting from October 2024 to June 2025. This timeframe was selected based on technical considerations to ensure the data collected would be accurate, valid, and aligned with the research objectives. Primary data for this study is obtained through a questionnaire. The questionnaire adopts a five-point Likert scale, which is used to measure the level of respondent agreement with each statement. The statements will be distributed to 65 employees, consisting of both staff and management personnel within the company. These employees are considered capable of providing valid information, as they are directly involved in both operational and managerial processes.

Table 1 presents the 46 questionnaire items that have been designed and prepared for distribution as follows:

Table 1. Indicators of Variable Statements

Variable and Reference	Statement Indicators
Halal Certification (Alfarizi, 2023; Raisqi & Fariana, 2022; Zulaikha et al., 2024)	The company conducts awareness sessions on the importance of halal certification for products/services.
	The company has appointed a person-in-charge to stay updated on halal certification requirements.
	The company regularly informs employees that halal certification increases customer trust.
	Written policies and procedures related to halal assurance are in place.
	The company has a team responsible for implementing halal certification.
	The company is prepared to recall products that do not meet food safety requirements.

	The warehouse only handles materials approved by LPPOM MUI and listed in the halal database.
	Facilities and infrastructure at critical points comply with halal regulations.
	The company displays halal logos on packaging and promotional materials.
	All employees have received information on the importance of adhering to halal principles.
	The company has a documented halal quality management system to support traceability. The company takes customer feedback regarding halal compliance seriously.
Quality Culture (Setyawati et al., 2022)	Top management actively participates in quality improvement policies.
	I feel supported by my supervisor in implementing quality standards.
	Management provides tools and facilities to maintain quality.
	The company has a strategic plan specifically for quality improvement.
	Quality policies are updated regularly based on performance evaluations.
	Employees are involved in the quality planning process.
	I often participate in team discussions about quality improvement.
	Teamwork within the company encourages innovation and process improvement.
	Quality problem-solving is done collaboratively within teams.
	The company has a formal system for managing product and service quality.
	The company conducts internal audits to assess compliance with quality standards.
	I am familiar with the standard operating procedures (SOPs) relevant to my work.
ISO 9001:2015 QMS (Pressa et al., 2024)	Employees receive appropriate training to support their job roles.
	Employees feel responsible for the quality of their work.
	Work processes are clearly documented.
	Employees understand how their work connects to other departments.
	The company is open to changes aimed at improving performance.
	Suggestions from employees and customers are used for decision-making and quality improvements.
	Important decisions are based on valid data or factual evidence.
	Decisions are not made based on assumptions alone.
	The company maintains good cooperation with suppliers and partners.
	The company regularly evaluates suppliers to improve quality.
Operational Performance (Amaruddin et al., 2022)	The number of products produced aligns with available labor.
	Materials, tools, and labor are used efficiently during operations.
	The company has a system to monitor employee productivity.
	Product errors have decreased since implementing halal, quality, and ISO systems.
	Employees check product quality before delivery to customers.
	Equipment is repaired or replaced if it causes defective products.
	The company invests in preventing product defects.
	Company profits are affected by costs related to correcting product quality issues.
	Quality control helps reduce overall quality-related costs.
	The company provides satisfactory solutions for quality issues during delivery.
	Internal communication (production, logistics, service) is effective.
	The company clearly informs customers about product quality, order status, and delivery updates.

(Source: Compiled from various references, 2025)

Once the data had been collected, a tabulation process was carried out to organize

the raw data into a format ready for analysis. Data analysis was conducted using SmartPLS 4, a multivariate analysis method used to test relationships between variables in a theoretical model, particularly when the model is complex and the research objective is predictive in nature (Ghozali & Kusumadewi, 2023). The analysis began with the outer model assessment, which includes testing for indicator validity and reliability. This was followed by a model fit evaluation to assess how well the research model aligns with the available data. The analysis then proceeded to the inner model assessment, which involves examining the R^2 (coefficient of determination) and hypothesis testing to determine the significance of relationships among variables within the structural model, as well as f^2 (effect size) values to evaluate the strength of relationships between latent variables.

4. RESULTS AND DISCUSSION

4.1 Respondent Characteristics

The data in this study were obtained from primary sources through a questionnaire distributed to employees of an import-export company. The respondents were predominantly male (55.4%). In terms of age, 49.2% were between 21 and 30 years old, indicating that the majority of the workforce is in their young and productive years. From an educational standpoint, 60% held a bachelor's degree (S1), which suggests a sufficient level of education to understand the company's systems and operational processes. Meanwhile, in terms of work experience, 49.2% had been employed for more than 8 years, demonstrating a substantial level of experience in understanding the company's operational dynamics and the implementation of existing systems. Table 2 presents a detailed breakdown of the respondents' characteristics.

Table 2. Respondent Characteristics

Characteristics	Total (persons)	Percentage (%)
Gender		
Male	36	55,4
Female	29	44,6
Age		
20 years		
21-30 years	32	49,2
31-40 years	16	24,6
>40 years	17	26,2
Education		
High Schoo	26	40
Diploma		
Bachelor's Degree (S1	39	60
Postgraduate		
Work Experiace		
<2 years	3	4,6
3-5 years	15	23,1
6-8 years	15	23,1
>8 years	32	49,2

(Source: Google Form Result, 2025)

4.2 Outer Model Analysis

According to (Ghozali & Kusumadewi, 2023), the outer model represents the measurement model used to assess the validity and reliability of indicators in reflective constructs.

4.2.1 Convergent Validity

Convergent validity occurs when indicators measuring the same construct are highly correlated, indicating that they truly represent the intended latent variable (Hair et al., 2021). Two primary metrics are used to assess this:

a. Loading Factor

Indicators are considered valid if their loading factor exceeds 0.70. In exploratory research, loadings between 0.60 and 0.70 may still be acceptable.

Table 3. Outer Loading result of convergent validity test

Instrument	Quality Culture (X2)	Operational Performance (Y)	ISO 9001:2015 QMS (Z)	Halal Certification (X1)	Desc
BK1	0.733				Valid
BK2	0.846				Valid
BK3	0.730				Valid
BK4	0.730				Valid
BK5	0.821				Valid
BK6	0.825				Valid
BK7	0.809				Valid
BK8	0.770				Valid
BK9	0.829				Valid
BK10	0.743				Valid
BK11	0.729				Valid
BK12	0.766				Valid
KO1		0.824			Valid
KO2		0.797			Valid
KO3		0.755			Valid
KO4		0.802			Valid
KO5		0.841			Valid
KO6		0.784			Valid
KO7		0.831			Valid
KO8		0.843			Valid
KO9		0.778			Valid
KO10		0.812			Valid
KO11		0.777			Valid
KO12		0.835			Valid
SMM1			0.819		Valid
SMM2			0.784		Valid
SMM3			0.783		Valid
SMM4			0.811		Valid
SMM5			0.840		Valid
SMM6			0.762		Valid
SMM7			0.826		Valid
SMM8			0.821		Valid
SMM9			0.845		Valid
SMM10			0.754		Valid
SH1				0.763	Valid
SH2				0.771	Valid
SH3				0.710	Valid
SH4				0.765	Valid
SH5				0.784	Valid
SH6				0.768	Valid
SH7				0.842	Valid
SH8				0.778	Valid
SH9				0.778	Valid
SH10				0.843	Valid
SH11				0.773	Valid
SH12				0.768	Valid

(Source: Primary data processed, 2025)

Based on the analysis, all indicator loading values exceeded 0.70, confirming that each item is valid and appropriately measures its intended construct.

b. Average Variance Extracted (AVE)

An AVE value of ≥0.50 indicates that the construct explains more than half of the

variance in its indicators, satisfying convergent validity.

Table 4. AVE result of convergent validity test

Variable	AVE	Description
Halal Certification (X1)	0.607	Valid
Quality Culture (X2)	0.606	Valid
ISO 9001:2015 QMS (Z)	0.648	Valid
Operational Performance (Y)	0.651	Valid

(Source: Primary data processed, 2025)

The AVE (Average Variance Extracted) values for each variable are as follows: Halal Certification = 0.607, Quality Culture = 0.606, ISO 9001:2015 Quality Management System = 0.648, and Operational Performance = 0.651. Since all four variables have AVE values ≥ 0.50, they are considered to meet the criteria for convergent validity.

4.2.2 Discriminant Validity

Discriminant validity refers to the extent to which a construct is truly distinct from other constructs within the model. This form of validity ensures that the indicators measure only the intended construct and are not excessively correlated with other constructs (Hair et al., 2021). In this study, discriminant validity was assessed using the Fornell-Larcker Criterion, which states that the square root of a construct's AVE should be greater than its correlations with other constructs in the model (Hair et al., 2021:140).

Table 5. Fornell-Larcker result of dicriminant validity test

Variable	Quality Culture (X2)	Operational Performance (Y)	ISO 9001:2015 QMS (Z)	Halal Certification (X1)	Desc
Quality Culture (X2)	**0.779**				Valid
Operational Performance (Y)	0.620	**0.807**			Valid
ISO 9001:2015 QMS (Z)	0.450	0.771	**0.805**		Valid
Halal Certification (X1)	-0.111	0.558	0.489	**0.779**	Valid

(Source: Primary data processed, 2025)

Based on Table 5, the following conclusions can be drawn:
1) The square root of AVE for Quality Culture is 0.779. Its correlations with other constructs—Operational Performance (0.620), ISO 9001:2015 QMS (0.450), and Halal Certification (-0.111)—are all lower than 0.779, indicating that discriminant validity is established for this construct.

2) The square root of AVE for Operational Performance is 0.807. Its correlations with Quality Culture (0.620), ISO 9001:2015 QMS (0.771), and Halal Certification (0.558) are all below 0.807, thus confirming its discriminant validity.

3) The square root of AVE for ISO 9001:2015 QMS is 0.805. Its correlations with Quality Culture (0.450), Operational Performance (0.771), and Halal Certification (0.489) are all lower than 0.805, indicating satisfactory discriminant validity.

4) The square root of AVE for Halal Certification is 0.779. Its correlations with Quality

Culture (-0.111), Operational Performance (0.558), and ISO 9001:2015 QMS (0.498) are all less than 0.779, confirming that this construct also meets the discriminant validity requirement.

4.2.3 Reliability Test

Internal reliability refers to the consistency with which the indicators measure their respective constructs. In Partial Least Squares (PLS) analysis, reliability is assessed through two key metrics: composite reliability and Cronbach's alpha. A construct is considered reliable if its composite reliability score exceeds 0.70. Similarly, a Cronbach's alpha value above 0.70 also indicates acceptable internal consistency. Cronbach's alpha is typically used to support or strengthen the interpretation of composite reliability (Hair et al., 2021).

Table 6. Cronbach's Alpha & Composite Reliability Result

Variable	*Cronbach's Alpha*	*Composite Reliability*	Description
Halal Certification (X1)	0.941	0.944	Reliabel
Quality Culture (X2)	0.941	0.947	Reliabel
ISO 9001:2015 QMS(Z)	0.940	0.942	Reliabel
Operational Performance (Y)	0.951	0.952	Reliabel

(Source: Primary data processed, 2025)

The results presented in the table indicate that the Cronbach's Alpha values for each construct are as follows: Halal Certification = 0.941, Quality Culture = 0.941, ISO 9001:2015 QMS = 0.940, and Operational Performance = 0.951. All of these values are ≥ 0.70, which confirms that each construct demonstrates strong internal reliability. Similarly, the composite reliability values are also well above the threshold: Halal Certification = 0.944, Quality Culture = 0.947, ISO 9001:2015 QMS = 0.942, and Operational Performance = 0.952. Since all composite reliability scores exceed 0.70, it can be concluded that each construct is reliably measured.

4.2.4 Model Fit Test

Model fit refers to the extent to which the developed measurement model (outer model) and structural model (inner model) align with the empirical data (Hair et al., 2021). In other words, before analyzing the relationships between constructs, it is essential to ensure that the model is structurally reasonable and reflects the actual data. Several indices can be used to assess model fit, including

Table 7. Model fit result

Parameter	*Rule of Thumb*	Parameter Estimate	Description
SRMR	Less than 0.10	0.088	Fit
d-ULS	**>** 0.05	8.376	Fit
d-G	**>** 0.05	10.294	Fit
Chi Square	χ^2 statistic ≥ χ^2 table	2148.741 ≥ 61.656	Fit

(Source: Primary data processed, 2025)

Based on the model fit test results presented in Table 7, it can be concluded that the model used in this study is appropriate for analyzing the relationships among the latent variables. This indicates that the model fits the data well and possesses adequate predictive relevance.

1. SRMR (Standardized Root Mean Square Residual): The SRMR value of 0.088 falls

below the threshold of 0.10, suggesting a good fit between the observed data and the theoretical model. This means that the difference between the observed and model-implied covariance matrices is minimal, indicating a well-fitting model.

2. d-ULS (Unweighted Least Squares Discrepancy): The d-ULS value of 8.376 exceeds the minimum threshold of 0.05, indicating that the model structure does not show substantial deviation and remains acceptable. This suggests that the relationships specified in the model closely resemble the patterns observed in the data.

3. d-G (Geodesic Discrepancy): With a value of 10.294—also above the 0.05 threshold—the model demonstrates a good global fit, indicating no significant discrepancies between the model and the actual data.

4. Chi-Square: The Chi-Square value of 2,148.741 is substantially higher than the critical value of 61.656, indicating that the model exhibits a statistically significant level of fit to the data. This suggests that the structural framework of the model is effective in explaining the relationships among the variables.

4.2.5 Inner Model Analysis

According to Sarwono, as cited in Artameviah (2022), inner model analysis aims to examine the hypothesized relationships between exogenous and endogenous latent variables. In this study, the exogenous latent variables are Halal Certification (X1) and Quality Culture (X2), both of which function as independent variables. The endogenous latent variables are Operational Performance (Y) and the ISO 9001:2015 Quality Management System (Z). The following section describes the procedures used to assess the inner model in this study:

4.3 R-square (R^2)

According to (Alam & Santosa, 2022), one of the key indicators in evaluating the inner model is by examining the R-square value (indicator reliability) for the dependent construct and the t-statistic obtained from the path coefficient testing. The R^2 value, or coefficient of determination, is used to measure the extent to which independent variables influence the dependent variable. The R^2 value is categorized as follows: 0.75 (Strong), 0.50 (Moderate), and 0.25 (Weak) (Hair et al., 2021).

Tabel 8. R-square result (R^2)

Variable	R-square	R-square adjusted
Operational Performance (Y)	0.827	0.819
ISO 9001:2015 QMS (Z)	0.497	0.480

(Source: Primary data processed, 2025)

The analysis results show that the R-square value for the Operational Performance variable is 0.827, meaning that 82.7% of the variance in this variable can be explained by the independent variables in the model. The remaining 17.3% is attributed to factors outside the model. This indicates a very strong relationship between the independent variables and operational performance.

Meanwhile, the R-square value for the ISO 9001:2015 Quality Management System variable is 0.497, suggesting that 49.7% of its variance is explained by the independent variables, while the remaining 50.3% is influenced by external factors not included in the model. This result implies a moderate relationship, indicating that the model is reasonably effective in explaining the factors influencing ISO 9001:2015 QMS, although external influences still play a role.

4.4 Hypothesis Testing

Hypothesis testing is conducted to determine the significance of the influence of independent variables on dependent variables, both partially and simultaneously. The test is carried out by comparing the t-statistic value to the t-table value of 1.96, at a significance level of p-value = 0.05. If the t-statistic exceeds the t-table threshold (t > 1.96), it can be concluded that the exogenous variable has a statistically significant effect on the endogenous variable (Savitri et al., 2021). The following are the results of the bootstrapping analysis, which include both direct and indirect effects in the structural model.

Tabel 9. Hypothesis test result

Hypothesis	Original sample (O	Sample mean (M)	Standard deviation (STDEV)	T statistics (STDEV)	P values	Desc
H1: Halal Certification (X1) → ISO 9001:2015 Quality Management System (Z)	0.546	0.542	0.104	5.260	0.000	Accepted
H2: Quality Culture (X2) → ISO 9001:2015 Quality Management System (Z)	0.511	0,509	0.084	6.108	0.000	Accepted
H3: Halal Certification (X1) → Operational Performance (Y)	0.473	0.472	0.063	7.534	0.000	Accepted
H4: ISO 9001:2015 Quality Management System (Z) → Operational Performance (Y)	0.297	0.285	0.063	4.702	0.000	Accepted
H5: Quality Culture (X2) → Operationa Performance (Y)	0.539	0.543	0.072	7.452	0,000	Accepted
H6: The effect of Hala Certification (X1) on Operational Performance (Y) mediated by ISO 9001:2015 Quality Management System (Z)	0.162	0.155	0.047	3.441	0.001	Accepted
H7: The effect of Quality Culture (X2) on Operational Performance (Y) mediated by ISO 9001:2015 Quality Management System (Z)	0.151	0.145	0.041	3.683	0.000	Accepted

(Source: Primary data processed, 2025)

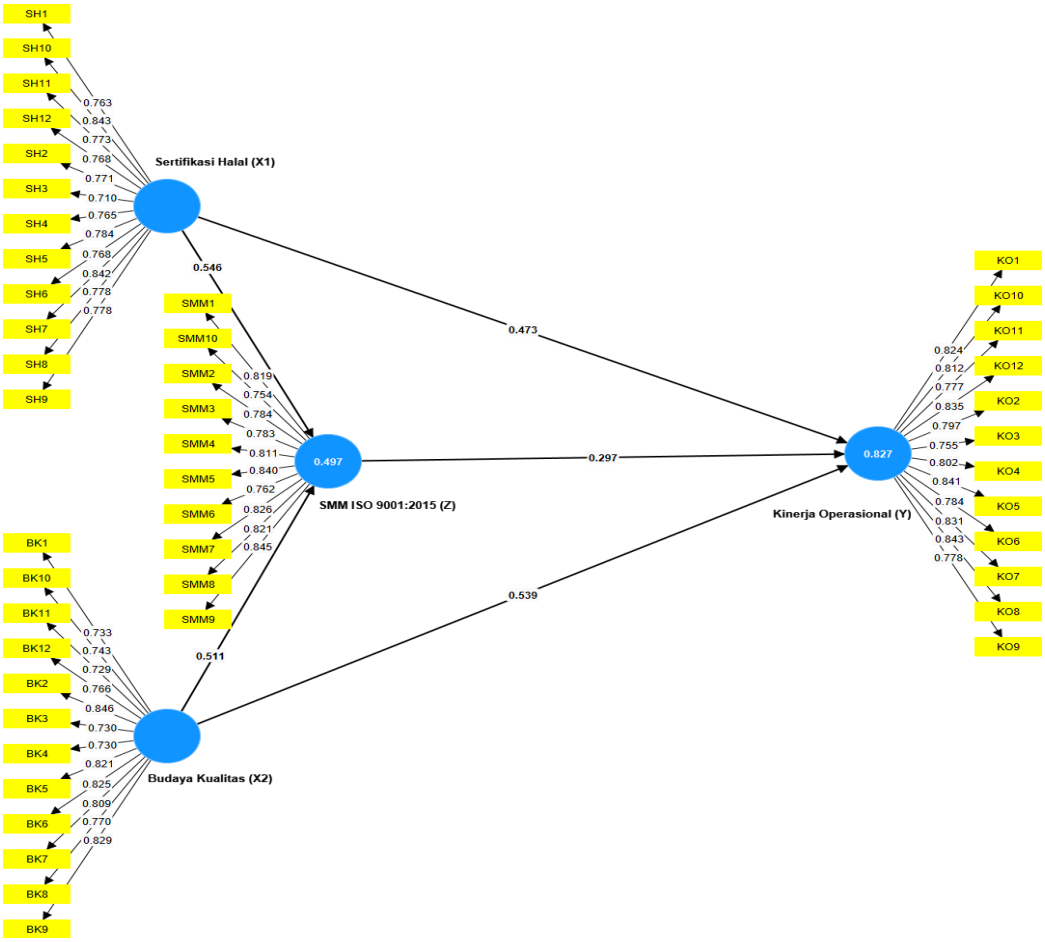

Figure 4. Output model PLS SEM Algorithm

4.5 Effect Size (F^2)

4.5.1 Direct Effect Size

Effect size measures the magnitude of influence that an independent variable exerts on a dependent variable within the structural model. This test is important for evaluating the practical significance of relationships between variables, beyond mere statistical significance (Latan & Ghozali, 2021). The effect size (f^2) indicates the contribution of an independent variable in explaining the variance of the dependent variable. According to Savitri et al (2021), an f^2 value is interpreted as follows: Small if $f^2 < 0.02$; Medium if $0.02 \leq f^2 \leq 0.15$; Large if $f^2 > 0.35$.

Table 10. Direct effect size test result (f^2)

Variable	Quality Culture (X2)	Operational Performance (Y)	ISO 9001:2015 QMS (Z)	Halal Certification (X1)
Halal Certification (X1)		0.806	0.584	
Quality Culture (X2)		1.098	0.512	
ISO 9001:2015 QMS (Z)		0.256		
Operational Performance (Y)				

(Source: Primary data processed, 2025)

4.5.2 Indirect Effect Size (Upsilon (V))

Mediated effect size can be calculated manually. Lachowicz et al as cited in Nadziroh & Nugrohoseno (2023), recommend using the Upsilon (v) mediation effect

size, with the following interpretation thresholds: Small = 0.01; Medium = 0.075; Large = 0.175. The Upsilon (v) effect size measures the extent to which a mediating variable explains the relationship between an independent variable (X) and a dependent variable (Y) in a PLS-SEM framework. Upsilon is used to evaluate the significance and strength of indirect (mediated) effects (Hair et al., 2021).

The formula for calculating the Upsilon (v) mediated effect size is as follows:

$v=\beta_2 M \times \beta_2 Y|M \circ X \circ$

Explanation:

- $\beta_2 M$
- Path coefficient from the independent variable (X) to the mediator (M).
- Indicates the magnitude of the influence of X on M. $\beta_2 Y|M \circ X \circ$
- Path coefficient from the mediator (M) to the dependent variable (Y), while controlling for or isolating the direct effect of X.
- In other words, this represents the effect of M on Y when the direct influence of X on Y is held constant.
- Symbol ∘ (small circle)
- Indicates that the effect being calculated is an indirect or partial effect, where the direct path from X to Y is controlled for or excluded.

Table 11. Indirect Effect Size Result (F^2)

No	Variable	Upsilon Statistic (v)	Description
1	Halal Certification => ISO 9001:2015 QMS => Operational Performance	$= (0.546)^2 \times (0.297)^2$ $= 0.026$	Moderate mediation effect
2	Quality Culture => ISO 9001:2015 QMS => Operational Performance	$= (0.511)^2 \times (0.297)^2$ $= 0.023$	Moderate mediation effect

(Source: Primary data processed, 2025)

The analysis results above are based on findings obtained from 65 respondents, gathered through the distribution of a questionnaire consisting of 46 items. The questionnaire measured the influence of halal certification and quality culture on operational performance, with the mediating role of the ISO 9001:2015 quality management system, in an import-export company located in the Cikarang Industrial Estate. The results are presented as follows:

1. H1: The Effect of Halal Certification on ISO 9001:2015 Quality Management System

The hypothesis testing results show a significance value of 0.000 < 0.05, with a path coefficient of 0.546 and a t-statistic of 5.260 > 1.96. This confirms that the first hypothesis (H1)—stating that Halal Certification (X1) has a significant effect on the ISO 9001:2015 Quality Management System (Z)—is supported. This finding is consistent with the study conducted by S. D. Puspaningtyas and S. Sucipto titled *"Integration of Halal Assurance System (HAS) in the Integrated Management System (IMS) to Support Food Industry Performance: A Review"*, published in *IOP Conference Series: Earth and Environmental Science*, Vol. 733, No. 01, 2021.

2. H2: The Effect of Quality Culture on ISO 9001:2015 Quality Management System

The test results show a significance value of 0.000 < 0.05, a path coefficient of 0.511, and a t-statistic of 6.108 > 1.96. This confirms that the second hypothesis (H2)—that Quality Culture (X2) has a significant effect on the ISO 9001:2015 Quality Management System (Z)—is accepted. This result is supported by the findings of Miftakul Huda and Nurhidayati in their article titled *"Analisis Penyerapan Budaya Kualitas Terhadap Keberhasilan Penerapan Sistem Manajemen Mutu ISO 9001 di*

Perusahaan Kawasan Jababeka Cikarang", published in *JIMEA: Jurnal Ilmiah MEA*, Vol. 4, No. 3, 2020.

H3: The Effect of Halal Certification on Operational Performance

The test results reveal a significance value of 0.000 < 0.05, a path coefficient of 0.473, and a t-statistic of 7.534 > 1.96, indicating that the third hypothesis (H3)—that Halal Certification (X1) significantly affects Operational Performance (Y)—is supported. This finding aligns with the research conducted by Mahmoud Amer in the article titled *"Linkage Among Halal Quality Standard Certification and SME's Performance: Palestinian Food Halal Certified SME's Context"*, published in the *Arab Gulf Journal of Scientific Research*, Emerald Publishing, October 16, 2023 (ISSN: 2536-0051).

H4: The Influence of ISO 9001:2015 QMS on Operational Performance

The hypothesis test yields a significance value of 0.000 < 0.05, with a path coefficient of 0.297 and a t-statistic of 4.702 > 1.96. This indicates that Hypothesis 4 (H4)—stating that the ISO 9001:2015 Quality Management System (Z) significantly influences Operational Performance (Y)—is accepted. This is supported by the research of Hamdan Amaruddin, Faturrohman, and Melati Kusuma Wardhani in their article *"Sistem Manajemen Mutu ISO 9001:2015 Terhadap Kinerja Operasional melalui Budaya Kualitas dan Perilaku Produktif Karyawan"*, published in *Master: Jurnal Manajemen Strategik Kewirausahaan*, Vol. 2(1), 2022, pp. 29–38.

H5: The Influence of Quality Culture on Operational Performance

The test result shows a significance value of 0.000 < 0.05, with a path coefficient of 0.539 and a t-statistic of 9.845 > 1.96. This supports Hypothesis 5 (H5)—that Quality Culture (X2) significantly influences Operational Performance (Y). This finding is in line with the study by Miftakul Huda, Nani Hartati, and Wiji Safitri in the article *"Penerapan Total Quality Management melalui Budaya Kualitas terhadap Kinerja Operasional perusahaan Manufaktur Kawasan Hyundai"*, published in *JSMA (Jurnal Sains Manajemen & Akuntansi)*, Vol. 14, No. 2, 2022. Moreover, the direct effect size (f^2) of 1.098 further reinforces that quality culture has a very strong influence on operational performance.

H6: The Influence of Halal Certification on Operational Performance through ISO 9001:2015 QMS (Mediation)

The hypothesis test reveals a significance value of 0.001 < 0.05, with a path coefficient of 0.162 and a t-statistic of 3.441 > 1.96. This confirms that Hypothesis 6 (H6)—stating that Halal Certification (X1) significantly influences Operational Performance (Y) through the mediation of ISO 9001:2015 QMS (Z)—is supported. This result aligns with the findings of S.D. Puspaningtyas and S. Sucipto in the same 2021 article mentioned in H1.

H7: The Influence of Quality Culture on Operational Performance through ISO 9001:2015 QMS (Mediation)

The test result shows a significance level of 0.000 < 0.05, with a path coefficient of 0.151 and a t-statistic of 3.683 > 1.96. Therefore, Hypothesis 7 (H7)—which states that Quality Culture (X2) significantly affects Operational Performance (Y) through the mediation of ISO 9001:2015 QMS (Z)—is accepted. This is supported by the study conducted by Issa Khalfan, Zaharuzaman Jamaluddin, and Setyawan Widyarto in the article *"Effect of Leadership and Quality Culture on Quality Management Practices and Operational Performance of Construction Companies in Oman"*, published in the *International Journal of Quality & Reliability Management*, Vol. 39, No. 7, 2022.

CONCLUSION

Based on the research findings and the discussion presented earlier regarding the

influence of halal certification and quality culture on operational performance through the mediation of the ISO 9001:2015 quality management system in an import-export company located in the Cikarang Industrial Estate, the conclusions are as follows: 1) There is a positive and significant influence of halal certification on ISO 9001:2015 QMS, as indicated by a path coefficient of 0.546, confirming Hypothesis 1 (H1). The direct effect size (f^2) of 0.584 falls within the high category, suggesting that halal certification has a substantial impact on strengthening quality management systems. It encourages company to develop more structured and well-documented procedures, reinforcing the QMS by aligning every process with halal standards that are consistent with ISO 9001:2015 principles; 2) There is a positive and significant influence of quality culture on ISO 9001:2015 QMS, with a path coefficient of 0.511, supporting Hypothesis 2 (H2). The direct effect size (f^2) of 0.512 also indicates a strong contribution of quality culture to the QMS. A strong quality culture embeds quality as part of daily work habits, thereby facilitating the implementation of ISO 9001:2015, since quality standards are already integrated into the company's routine operations; 3) There is a positive and significant influence of halal certification on operational performance, as shown by a path coefficient of 0.473, confirming Hypothesis 3 (H3). The direct effect size (f^2) of 0.806 indicates that halal certification plays a dominant role in improving operational performance. It enhances customer trust, strengthens raw material control, and promotes production efficiency— ultimately resulting in more disciplined and reliable processes; 4) There is a positive and significant influence of ISO 9001:2015 QMS on operational performance, with a path coefficient of 0.297, validating Hypothesis 4 (H4). The direct effect size (f^2) of 0.256 falls within the medium-to-high category, showing that the application of ISO 9001:2015 ensures standardized work processes, reduces errors, and improves efficiency—thereby contributing directly to enhanced operational performance; 5) There is a positive and significant influence of quality culture on operational performance, as indicated by a path coefficient of 0.539, supporting Hypothesis 5 (H5). The very high direct effect size (f^2) of 1.098 confirms that quality culture is the most dominant factor in improving operational performance. A strong quality culture fosters discipline, accuracy, and a continuous improvement mindset—leading to more productive outcomes and more efficient operations; 6) There is a positive and significant indirect effect of halal certification on operational performance through the mediation of ISO 9001:2015 QMS, as evidenced by a path coefficient of 0.162, supporting Hypothesis 6 (H6). The mediation effect is considered moderate, with an indirect effect size Upsilon (v) of $0.026 < 0.075$. This suggests that the ISO 9001:2015 QMS contributes to bridging the influence of halal certification on operational performance, although not dominantly. Company should focus on synchronizing halal standards with ISO QMS by explicitly incorporating halal principles—such as raw material control, hygiene, and product traceability—into ISO procedures, involving the halal team in system design and quality audits, and enhancing employee competencies to manage both systems synergistically. This ensures that halal certification is not merely a formality but a driving force behind continuous quality improvement and sustainable operational performance; 7) There is a positive and significant indirect effect of quality culture on operational performance through the mediation of ISO 9001:2015 QMS, as shown by a path coefficient of 0.151, supporting Hypothesis 7 (H7). The indirect effect size Upsilon (v) of $0.023 < 0.075$ indicates a moderate mediation effect, meaning that the QMS plays a supporting but not dominant role. The Company should reinforce the understanding that cultivating a quality culture is not just about shaping work attitudes but also a strategic means to strengthen a robust and sustainable ISO-based quality system. This can be done by embedding quality values into employees' daily behavior. With such integration, the company not only maintains ISO compliance but also fosters an operational performance that is excellent, adaptive, and results-oriented.

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