Dematel Approach to Improve Halal Logistics Productivity: A Study in Indonesia

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Abstract. The halal logistics industry has become one of the sectors experiencing rapid growth as awareness and global demand for halal-certified products increase. This research aims to enhance the productivity of halal logistics services at PT Multi Terminal Indonesia through the implementation of the Decision Making Trial and Evaluation Laboratory (DEMATEL) method. This method is used to analyze the cause-effect relationships among key performance indicators (KPIs) that influence operational productivity. The research is conducted through interviews, direct observations, and operational data analysis, focusing on KPIs such as halal document accuracy, information clarity, storage space readiness, halal product assurance, and halal regulation compliance. The results of the study identify several main causal factors that significantly impact the productivity of halal logistics services. These factors include halal document accuracy, product information clarity, storage facility readiness, and adherence to halal standards. The DEMATEL method allows for the visualization of cause-effect relationships among KPIs, making it easier for companies to identify and address weaknesses in the operational system. This analysis generates strategic recommendations to improve service efficiency, maintain halal product quality, and meet the needs of an increasingly complex market. This approach provides significant benefits to PT Multi Terminal Indonesia in optimizing halal logistics services. By enhancing operational efficiency, the company can strengthen its competitiveness in the halal logistics industry, build customer trust, and ensure the sustainability of services in facing future challenges. The results of this research are also expected to serve as a reference for further development in halal logistics management, particularly in integrating technology and halal standards to support the sustainability of the industry.

Keywords: halal logistics, Dematel approach, productivity, key performance indicators, supply chain management

I. INTRODUCTION

The Halal industry currently reaches 1.8 billion customers globally and is a rapidly growing business with its value estimated at USD 2.1 trillion. In addition, the average non-Muslim has extensive knowledge of halal products and services that are significant in improving quality of life, rationality, hygiene, safety, and environmental friendliness (Mahidin et al., 2016). Currently, thousands of products and services produced globally have been labeled with different halal processes such as symbols, logos, and certifications from countries such as Malaysia, Australia, United Arab Emirates (UAE), Singapore,

Indonesia, and China (Mahidin et al., 2016). Interest and demand for halal-certified products continues to increase worldwide because Halal is not just a religious obligation, but also has the power to control the market where the demand for halal food or products continues to increase significantly (Saidah & Lestari, 2021).

The chart above shows the projected market value growth of several industry sectors in Indonesia between 2020 and 2025. The food and beverage sector, which has great potential in the halal market, shows dominant growth from US\$135 billion in 2020 to US\$204 billion in 2025. This increase reflects the high demand for halal products in this sector. Other sectors, such as fashion, pharmaceuticals, cosmetics, tourism, and media and recreation also show an increase. The fashion sector is estimated to increase from US\$15.6 billion to US\$23.28 billion, while tourism increases from US\$3.37 billion to US\$8.03 billion. This data shows a positive trend in various sectors relevant to the halal industry, as demand for halal-certified products increases.

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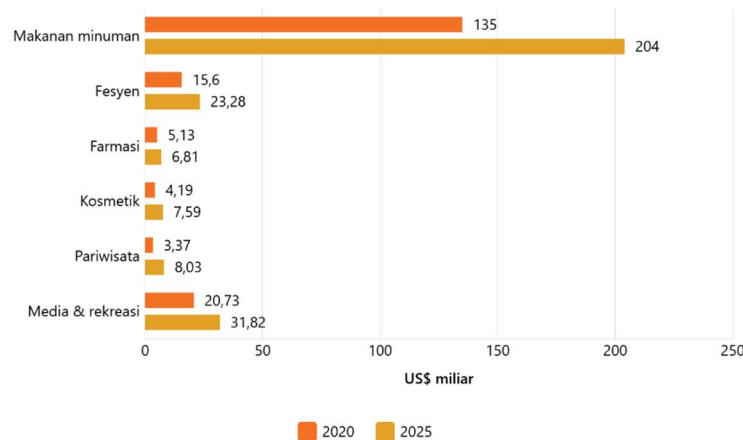
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Figure 1. Industry Sector Growth Chart

The Indonesian government has issued a policy to support the implementation of the halal concept in the industry in this country referring to law number 33 of 2014 in the first article which regulates the Halal Product Guarantee. The regulations for obtaining halal certification in Indonesia are summarized in the form of a halal assurance system, namely HAS 23000. This system is managed by the Indonesian Council of Ulama (LPPOM-MUI) as the official halal certification body. Although guidance related to the halal logistics process has been regulated in the halal assurance regulation (HAS) 23106 series (guidance on compliance with HAS criteria for logistics services), the technical guidelines have not been publicly published by the regulator. Therefore, halal logistics services are still relatively new and poorly understood by many logistics service providers in Indonesia today (Saidah & Lestari, 2021).

One of the halal logistics service providers in Indonesia is PT Multi Terminal Indonesia. The company offers halal logistics and cold storage services, with low temperature storage facilities that meet halal standards in order to ensure that food and beverage products are stored in accordance with halal principles. In running its business, PT Multi Terminal Indonesia provides cold storage facilities consisting of several types of room storage based on storage temperature, namely cold, chiller, and frozen as well as supporting yards for container storage. In addition, the combination of experience in

logistics and commitment to halal compliance makes PT Multi Terminal Indonesia a key player in solving logistics solutions and halal logistics services that support business growth and market needs that are increasingly complex over time.

PT Multi Terminal Indonesia's halal logistics & cold storage services have obtained Halal Assurance System (HAS) certification from MUI since the unit started operations (Pelindo Logistics Solutions, 2024). SJH is a management system designed to ensure that products meet halal standards in accordance with MUI halal certification requirements (LPPOM MUI, 2023). Halal product certification is fundamental to support the government in the JPH (Halal Product Guarantee) which came into effect in 2019. This is regulated in the Law of the Republic of Indonesia No. 33 of 2014 concerning halal product guarantees (Fazira et al., 2018). One of the requirements for obtaining SJH certification is to conduct an internal audit, which must be carried out at least once a year to assess the implementation of halal assurance in the company. The internal audit procedure is prepared by the party responsible for SJH. Improvements must be made within a predetermined time limit if weaknesses are found in the halal assurance aspect (LPPOM MUI, 2023).

The halal productivity performance assessment of PT Multi Terminal Indonesia needs to be carried out to ensure that the Halal Assurance System (HAS) implemented is running effectively and sustainably. This is important

because PT Multi Terminal Indonesia must comply with halal regulations stipulated in the JPH (Halal Product Guarantee) Law and maintain the sustainability of halal certification from MUI. The main principles of sustainability of halal certification include resource efficiency, social responsibility, and compliance with applicable regulations. In the context of PT Multi Terminal Indonesia, this sustainability focuses on maintaining consistent halal standards. Therefore, the company needs to conduct a performance assessment to identify and correct weaknesses in the system, which is a key requirement in the annual internal audit to maintain the certification. PT Multi Terminal Indonesia's halal logistics and cold storage requires a system to assess the performance of existing halal productivity to support operational efficiency, improve competitiveness in the halal industry, and build customer and business partner confidence in halal logistics and cold storage services.

One approach to assessing halal productivity performance is to use the Multi-Criteria Decision Making (MCDM) method. With this approach, the performance of the halal logistics supply chain at PT Multi Terminal Indonesia can be measured and evaluated for better development. This research uses one of the methods in the MCDM approach, namely DEMATEL (Decision Making Trial and Evaluation Laboratory). The DEMATEL approach in improving the productivity of halal logistics services is a strategic step that can support comprehensive decision making. DEMATEL is a useful approach to map and analyze the cause-and-effect relationships between various factors that affect a system, such as supply chains and logistics services. The DEMATEL approach in the context of halal logistics will enable PT Multi Terminal Indonesia to better understand and identify critical factors that have a major impact on the productivity and integrity of halal services. Through DEMATEL, the company can map various aspects of the halal logistics system, such as compliance with halal standards, on-time delivery,
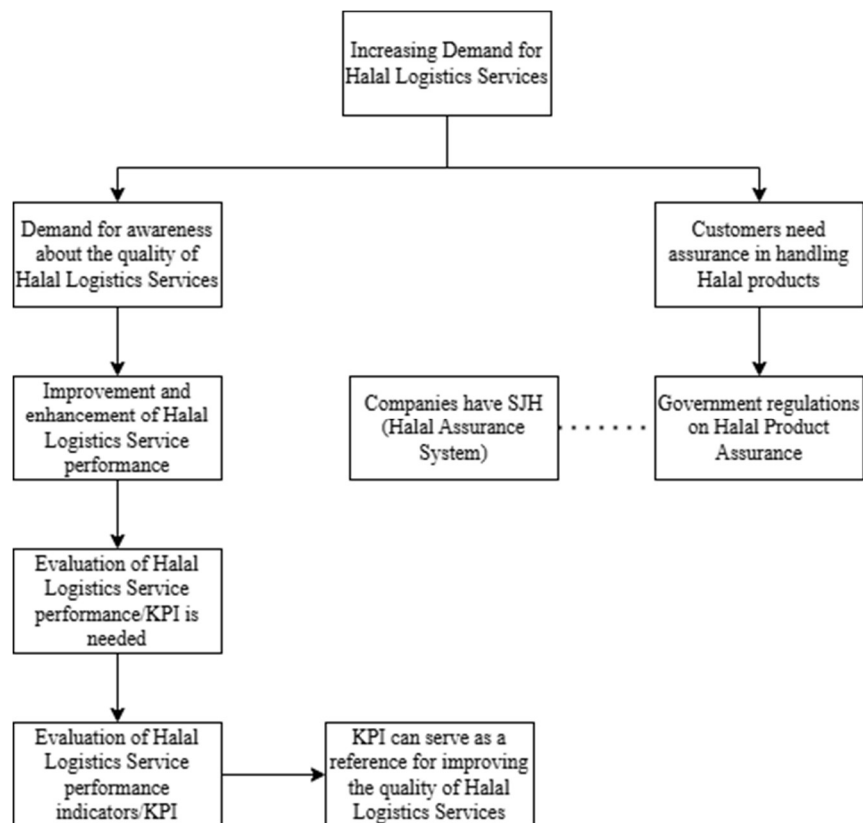

Figure 2. Problem Interrelation Diagram

cold storage quality, and compliance with halal product assurance regulations. This analysis will help PT Multi Terminal Indonesia in identifying the main factors that cause various challenges in the halal logistics process, so that the process can be optimized in a sustainable manner. The DEMATEL method can also help in identifying interrelationships between variables that affect each other, both upstream and downstream of the supply chain. Thus, this analysis can provide recommendations for strategic steps to improve overall performance, from the production process, packaging, to transportation of halal products. This approach can be a strong basis for developing a more effective and efficient work plan, which ultimately increases company productivity and provides a competitive advantage in the halal logistics industry in Indonesia.

Based on observations of activities taking place in halal logistics warehouses and cold storage, there is a need to improve the performance of halal logistics services so that company productivity can be increased. One of the strategic steps to achieve this goal is to use the DEMATEL (Decision Making Trial and Evaluation Laboratory) method approach to comprehensively assess halal productivity performance. Performance measurement through this method is very important in maintaining company performance, especially in facing future business competition (Fauziyah et al., 2020). With maintained performance, the company will always be ready and responsive to customer demand in halal logistics and cold storage services in Indonesia. In addition, good performance will also increase customer trust in the company. Below is presented a diagram of the problem linkage in Halal Logistics and Cold Storage services.

Based on this description, it is necessary to measure productivity performance in the Halal Logistics & Cold Storage section at PT Multi Terminal Indonesia. Performance measurement is very important to do so that companies can improve service performance and improve the quality of service provided to customers. There are several types of methods used to measure the company's productivity performance. In order to determine the method that best suits the research, a comparison is made on three methods that are most often used in measuring performance, including the Supply Chain Operations Reference (SCOR) method, Analytic Hierarchy Process (AHP), and Decision-Making Trial and Evaluation Laboratory (DEMATEL).

II. RESEARCH METHOD

In conducting research analysis of Halal Logistics & Cold Storage services, the method used is Decision Making Trial and Evaluation Laboratory (DEMATEL) with the following steps: First, determine the research topic obtained from direct observation of various activities at Halal Logistics & Cold Storage PT Multi Terminal Indonesia. Furthermore, research objectives are set so that the research process runs structured and organized, with literature studies related to Halal Supply Chain, Halal Storage, productivity, performance measurement, and the DEMATEL method.

Direct observations were made at the Halal Logistics & Cold Storage warehouse to understand the activities and processes taking place. Interviews with warehouse workers were conducted to obtain detailed information about operational activities and problems faced. Key Performance Indicators (KPIs) are identified based on observations and interviews with operational teams, operators, supervisors, and managers. Validation of KPIs was conducted with Halal Logistics & Cold Storage staff to match the actual activities in the warehouse. Questionnaires are designed based on the KPIs that have been identified and distributed to the warehouse operations team, operators, supervisors, and managers. Data from the questionnaire is analyzed through matrix calculation and normalization, then visualized to facilitate analysis of the relationship between elements. Analysis using DEMATEL was conducted to explore the interrelationship of performance elements. Finally, conclusions that answer the research objectives are drawn, including the identification of factors affecting productivity and development proposals using DEMATEL to improve the quality of halal

logistics services, along with suggestions for future research.

III. RESULT AND DISCUSSION

Data Collection

Data collection is a very important thing to support research. Data collection is done through interviews, questionnaires, and company documentation such as product movements and business activities carried out by the company. In this study, the design of Key Performance Indicators (KPI) for the halal supply chain was carried out. Designing and measuring Key Performance Indicators (KPI) with halal criteria

Table 1 Key Performance Indicator (KPI)

No.	KPI	Description
A	KPI-1 Chamber area readiness for use	Percentage of chamber area readiness for use
B	KPI-2 Clarity of stored information	Percentage of clarity of product information to be stored
C	KPI-3 Accuracy of documents with halal product information	Percentage of document accuracy with information regarding halal products
D	KPI-4 Accuracy of tools needed for product load-unload	Percentage of accuracy of tools needed for product load-unload
E	KPI-5 Utilization of chamber space for product storage	Percentage of utilization of chamber space for product storage
G	KPI-7 Products stored according to their type in the chamber	Percentage of products stored according to their type in the chamber
H	KPI-8 Accuracy of product entry and exit data recording	Percentage of accuracy in recording product entry and exit information
I	KPI-9 Assurance that halal products are not contaminated with non-halal substances	Percentage of assurance that halal products are not contaminated with non-halal substances
J	KPI-10 Tayyib (wholesomeness) of products stored in the warehouse	Percentage of tayyib (wholesomeness) of products stored in the warehouse
K	KPI-11 Assurance of room cleanliness	Percentage of assurance of room cleanliness
L	KPI-12 Employee discipline in using PPE (Personal Protective Equipment)	Percentage of employee discipline in using PPE
M	KPI-13 Accuracy of room temperature used	Percentage of accuracy in the room temperature used
N	KPI-14 Overall cleanliness of the warehouse	Percentage of overall cleanliness of the warehouse
O	KPI-15 Traceability of halal status of products stored	Percentage of traceability of halal status of products stored
P	KPI-16 Accuracy of products taken	Percentage of accuracy of products taken
Q	KPI-17 Accuracy of documents for products to be shipped	Percentage of accuracy of documents for products to be shipped
R	KPI-18 Halal assurance of products in the stripping area	Percentage of halal assurance of products in the stripping area
S	KPI-19 Customer compliance in issuing delivery notes	Percentage of customer compliance in issuing delivery notes
T	KPI-20 Vehicles do not carry non-halal products	Percentage of vehicles that do not carry non-halal products
U	KPI-21 Accuracy of required documents along with transported products	Percentage of accuracy of required documents along with transported products
V	KPI-22 Accuracy of product delivery time to customers based on the absence of complaints	Percentage of accuracy in product delivery time to customers based on the absence of complaints
W	KPI-23 Accuracy of product storage payment	Percentage of accuracy in product storage payment
X	KPI-24 Number of complaints reduced by approximately 20%	Percentage of complaints reduced by approximately 20%

provides a representation of performance results for companies in carrying out the halal supply chain process that is carried out so as to support company monitoring. The Key Performance Indicators (KPI) will be addressed to the staff, manager, and supervisor of the Halal Logistics & Cold Storage of PT Multi Terminal Indonesia, totaling 11 respondents. Respondents in this study were chosen because they have a deeper understanding of the relationship between indicators, so that the data collected becomes more valid and accurate. The following is a Key Performance Indicator (KPI) that has been made in this study.

After the KPI is created, KPI filling is carried out using the linguistic scale listed in the following table (Shieh et al., 2010).

Table 2. Linguistic Scale

Linguistic Scale	Variabel
0	No Influence
1	Small Influence
2	Moderate Influence
3	High Influence

The relationship between variables can be categorized as no effect if there is no influence at all between the two variables. For example, the relationship between KPI-1 and KPI-1 itself (without influence) is given a linguistic scale value of 0. If KPI-1 has little influence on changes in KPI-2, then the linguistic scale value is 1. If KPI-1 exerts a greater influence on KPI-2, but not enough to significantly affect KPI-2, then the linguistic scale value is 2. However, if KPI-1 as a whole significantly affects KPI-2, the linguistic

Table 1. Key Performance Indicator (KPI) Matrix

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
A	0	2	1	3	3	1	3	1	1	1	1	1	3	2	1	1	1	1	1	1	1	1	1	1
B	1	0	2	3	1	3	3	2	2	2	1	1	3	1	3	1	3	1	3	2	3	1	1	1
C	1	3	0	1	1	3	1	3	1	1	1	1	1	1	3	1	3	1	1	2	3	1	1	2
D	1	3	1	0	3	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	2
E	1	1	1	3	0	1	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	2
F	1	2	1	1	1	0	1	3	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	2
G	2	1	1	1	3	1	0	3	3	3	1	1	3	1	1	3	1	1	1	1	1	1	1	1
H	1	3	1	1	1	3	2	0	3	3	1	1	3	1	2	3	3	1	3	1	3	3	2	3
I	2	3	3	1	1	1	3	3	0	3	3	3	1	3	2	1	1	3	1	3	1	1	1	3
J	1	2	1	1	1	1	3	3	3	0	3	3	1	3	2	1	1	2	1	1	1	1	1	3
K	2	1	1	1	1	1	2	1	3	3	0	3	1	3	1	1	1	1	1	1	1	1	1	3
L	1	1	1	1	1	1	2	1	3	3	3	0	1	3	1	1	1	1	1	1	1	1	1	2
M	3	3	1	1	1	1	2	3	2	1	1	1	0	1	1	1	1	1	1	1	1	1	1	3
N	1	1	1	1	1	1	1	1	3	3	3	3	1	0	1	1	1	1	1	1	1	1	1	2
O	1	1	3	1	1	1	1	2	3	3	1	1	1	1	0	1	1	3	1	1	1	1	1	1
P	1	3	1	1	1	1	3	3	1	1	1	1	1	1	1	0	3	1	1	1	3	1	3	3
Q	1	3	1	1	1	1	1	3	2	1	1	1	1	1	1	3	0	1	1	1	3	3	1	3
R	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	0	1	1	1	3	1	2
S	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	3
T	1	1	1	1	1	1	1	1	3	2	1	1	1	1	1	1	1	1	1	0	1	3	1	3
U	1	3	1	1	1	3	1	3	1	1	1	1	1	1	1	3	3	1	1	1	0	1	1	3
V	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	1	3	1	3	0	1	2
W	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	1	1	1	1	1	0	2
X	1	1	3	3	3	2	1	3	3	2	2	1	3	1	1	3	3	2	1	1	3	3	2	0

scale value is 3.

Data Processing

Data processing in this research uses the Decision-Making and Evaluation Laboratory (DEMATEL) method to identify and understand the relationships between various key factors in the system. This method makes it possible to explore cause-and-effect relationships between system elements and define priorities between criteria based on their level of influence. The first step using the DEMATEL method is to create a matrix from the KPIs that have been created to map the influence of each indicator.

After the matrix is created, normalization is carried out to ensure that the influence value is in the standard range between 0 and 1. Furthermore, matrix normalization uses the $S = \frac{1}{\max 1 \le i \le n \sum_{j=1}^{n} a_{ij}}$ formula to equalize the data scale to make it easier to conduct further analysis. After normalizing, it is necessary to calculate the total matrix relationship using a formula $T = D(I - D)^{-1}$ to determine the direct and indirect effects between indicators. D is a direct influence matrix that has been normalized before and I is the identity matrix. This matrix describes the direct

Table 3. Total Indicator Importance Level

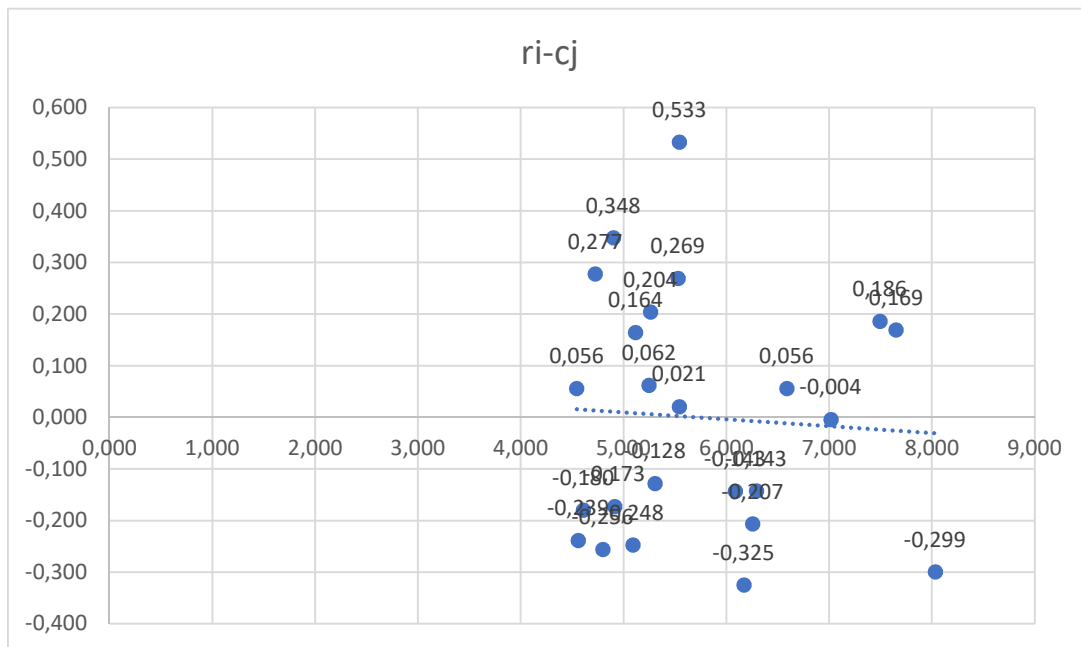|	Key Performance Indicators (KPI)	Ri	Cj	Ri + Cj	Ri-Cj	Identify
A	KPI-1 Chamber area readiness for use	2.624	2.277	4.901	0.348	Cause
B	KPI-2 Clarity of stored information	3.507	3.511	7.018	-0.004	Effect
C	KPI-3 Accuracy of documents with halal product information	3.507	2.505	5.543	0.533	Cause
D	KPI-4 Accuracy of tools needed for product load-unload	3.507	2.543	4.913	-0.173	Effect
E	KPI-5 Utilization of chamber space for product storage	3.507	2.527	4.799	-0.256	Effect
F	KPI-6 Completeness of documents required for stuffing process approval	3.507	2.670	5.092	-0.248	Effect
G	KPI-7 Products stored according to their type in the chamber	3.507	3.116	6.088	-0.143	Effect
H	KPI-8 Accuracy of product entry and exit data recording	3.507	3.741	7.650	0.169	Cause
I	KPI-9 Assurance that halal products are not contaminated with non-halal substances	3.507	3.653	7.493	0.186	Cause
J	KPI-10 Tayyib (wholesomeness) of products stored in the warehouse	3.507	3.266	6.587	0.056	Cause
K	KPI-11 Assurance of room cleanliness	3.507	2.630	5.530	0.269	Cause
L	KPI-12 Employee discipline in using PPE (Personal Protective Equipment)	3.507	2.529	5.262	0.204	Cause
M	KPI-13 Accuracy of room temperature used	3.507	2.760	5.541	0.021	Cause
N	KPI-14 Overall cleanliness of the warehouse	3.507	2.593	5.248	0.062	Cause
O	KPI-15 Traceability of halal status of products stored	3.507	2.476	5.116	0.164	Cause
P	KPI-16 Accuracy of products taken	3.507	3.217	6.291	-0.143	Effect
Q	KPI-17 Accuracy of documents for products to be shipped	3.507	3.231	6.256	-0.207	Effect
R	KPI-18 Halal assurance of products in the stripping area	3.507	2.394	4.609	-0.180	Effect
S	KPI-19 Customer compliance in issuing delivery notes	3.507	2.400	4.560	-0.239	Effect
T	KPI-20 Vehicles do not carry non-halal products	3.507	2.224	4.725	0.277	Cause
U	KPI-21 Accuracy of required documents along with transported products	3.507	3.248	6.171	-0.325	Effect
V	KPI-22 Accuracy of product delivery time to customers based on the absence of complaints	3.507	2.717	5.307	-0.128	Effect
W	KPI-23 Accuracy of product storage payment	3.507	2.244	4.545	0.056	Cause
X	KPI-24 Number of complaints reduced by approximately 20%	3.507	4.165	8.031	-0.299	Effect

Figure 3. Criteria Relationship Chart

and indirect influence between indicators.

After calculating the total relationship matrix, it is necessary to analyze the important criteria by calculating the r_i and c_j values of each indicator to identify influential criteria or factors. The r_i value is the number of rows indicating the total amount of influence the indicator receives from other indicators and c_j is the number of columns indicating the total amount of influence the indicator exerts on other indicators. The value of $r_i - c_j$ is used to determine whether an indicator acts as a cause or effect. Meanwhile, $r_i + c_j$ indicates the total importance or connectedness of the indicator.

Based on the results in Table 4, the highest value at $r_i + c_j$ shows the most important priority level to improve the company's productivity. The following are five KPIs that have the highest value, namely KPI 24 > KPI 8 > KPI 9 > KPI 3 > KPI 10 > KPI 16. The value $r_i - c_j$ shows whether an indicator is a cause or effect. If the value of $r_i - c_j$ is positive, it is included in the cause category and has an influence on other indicators. Meanwhile, if the value of $r_i - c_j$ is negative, it is included in the effect category, which means it has an influence on other

indicators. The following graph shows the relationship between criteria.

Indicators that have $r_i - c_j$ positive values, especially in the upper quadrant, belong to the cause category because they have a greater influence on other indicators than the influence they receive. For example, indicators that have values of $r_i - c_j$ 0.533, 0.348, and 0.277 on the chart show significant influence as cause factors. Changes that occur in these indicators are likely to significantly affect changes in other indicators. Negative values in the lower quadrant of the graph belong to the effect category, which means that the indicator receives influence from other indicators in the system and is not the main driver. For example, the values -0.325, -0.299, and -0.248 on the graph indicate that the indicator is more reactive to changes in other indicators. Meanwhile, the $r_i - c_j$ indicators with values close to zero have a balance between the influence exerted and received. For example, the values of -0.004, 0.021, and 0.056 play a neutral role as both cause and effect. These indicators do not significantly affect other indicators, but are not overly influenced by other indicators either. The following is a cause and effect mapping of KPIs that have been analyzed using DEMATEL

Table 4. Mapping Cause and Effect of Key Performance Indicators (KPI) Using DEMATEL

Cause	Effect
KPI-1 Readiness of chamber area for use	KPI-2 Clarity of stored information
KPI-3 Accuracy of documents with halal product information	KPI-4 Accuracy of tools needed for product load-unload
KPI-8 Accuracy of product entry and exit data recording	KPI-5 Utilization of chamber space for product storage
KPI-9 Assurance that halal products are not contaminated with non-halal substances	KPI-6 Completeness of documents required for the stuffing process approval
KPI-10 Tayyib (wholesomeness) of products stored in the warehouse	KPI-7 Products stored according to their type in the chamber
KPI-11 Assurance of room cleanliness	KPI-16 Accuracy of products taken
KPI-12 Employee discipline in using PPE (Personal Protective Equipment)	KPI-17 Accuracy of documents for products to be shipped
KPI-13 Accuracy of room temperature used	KPI-18 Halal assurance of products in the stripping area
KPI-14 Overall cleanliness of the warehouse	KPI-19 Customer compliance in issuing delivery notes
KPI-15 Traceability of halal status of products stored	KPI-21 Accuracy of required documents along with transported products
KPI-20 Vehicles do not carry non-halal products	KPI-22 Accuracy of product delivery time to customers based on the absence of complaints
KPI-23 Accuracy of product storage payment	KPI-24 Number of complaints reduced by approximately 20%

IV. Conclusion

After calculating and analyzing the data, followed by drawing conclusions to answer the problem formulation determined earlier. The first conclusion is that the factors that affect the productivity of halal logistics services can be identified through Key Performance Indicator (KPI) analysis. In this study, 24 KPIs have been determined as a reference for assessing productivity. Based on the analysis results, several KPIs such as KPI-2, KPI-4, KPI-5, KPI-6, KPI-7, KPI-16, KPI-17, KPI-18, KPI-19, KPI-21, KPI-22, and KPI-24 are proven to have a significant influence on service productivity. The Decision Making Trial and Evaluation Laboratory (DEMATEL) method approach shows a reciprocal relationship between KPIs that function as causes and KPIs that are affected (effect). For example, KPI-24, which relates to reducing the number of complaints by

20%, stands out as the highest priority indicator. In addition to being an influence on other KPIs, KPI-24 also has the highest r_i+c_j value, signaling the importance of focusing on reducing customer complaints to improve overall service productivity.

The second conclusion shows that the DEMATEL approach is a strategic step in improving the quality of halal logistics services. By understanding the inter-KPI influence, PT Multi Terminal Indonesia can identify priority KPIs that require improvement. One of them is KPI-24 which is important because the decrease in the number of complaints reflects a direct improvement in the quality of service perceived by customers. Through this approach, the company can design a more targeted strategy to improve other key KPIs, such as those related to operational efficiency, customer satisfaction, and process innovation. Thus, the implementation of DEMATEL not only helps in prioritizing improvements but also provides a framework for

more sustainable and productive service management in the halal logistics sector.

V. RECOMMENDATIONS

Based on the results of the research that has been done, there are several suggestions given to Halal Logistics & Cold Storage PT Multi Terminal Indonesia and further research as follows.

1. Key Performance Indicators (KPIs) that have been designed in this study can be used as a reference in measuring the achievement of company productivity in the halal supply chain.
2. Considering the results of performance measurements that have been carried out so that they can be used as material for performance evaluation by refining calculations and validated KPIs.
3. In further research, development can be carried out with a wider scope not only in the halal supply chain network but also in product halal certification.

VI. IMPLICATION

Based on research using the DEMATEL method to analyze the productivity of halal logistics services at PT Multi Terminal Indonesia, several managerial implications can be arranged as follows:

1. Strengthening the Supervision and Compliance System: Managers need to strengthen the supervision system for halal standard compliance, especially in the storage and transportation process. The use of the DEMATEL method helps identify the most influential factors, so that management can focus on those critical aspects to improve service quality.
2. Employee Competency Development: The results show the importance of halal document accuracy and clarity of product information. Therefore, employee training in the management of halal documents and information is a priority to ensure that every operational process runs according to standards.

3. Optimization of Storage Facilities: By highlighting the readiness of storage space as an important indicator, managers can design strategies to increase the capacity and quality of storage facilities to be more efficient and in line with halal logistics needs.
4. Technology Implementation: To support more effective management and tracking, management is advised to adopt the latest technology that can integrate operational processes with real-time monitoring systems, enabling early detection of potential problems that could disrupt productivity.
5. Operational Process Improvement: The cause-and-effect analysis that results from the DEMATEL method enables management to identify the relationships between various performance indicators. This provides insights that can be used to devise better operational policies and procedures, which contribute directly to increased productivity and efficiency.

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