THE EFFECT OF LOGISTICS COLLABORATION ON LOGISTICS PERFORMANCE IN THE MRO INDUSTRY IN INDONESIA.

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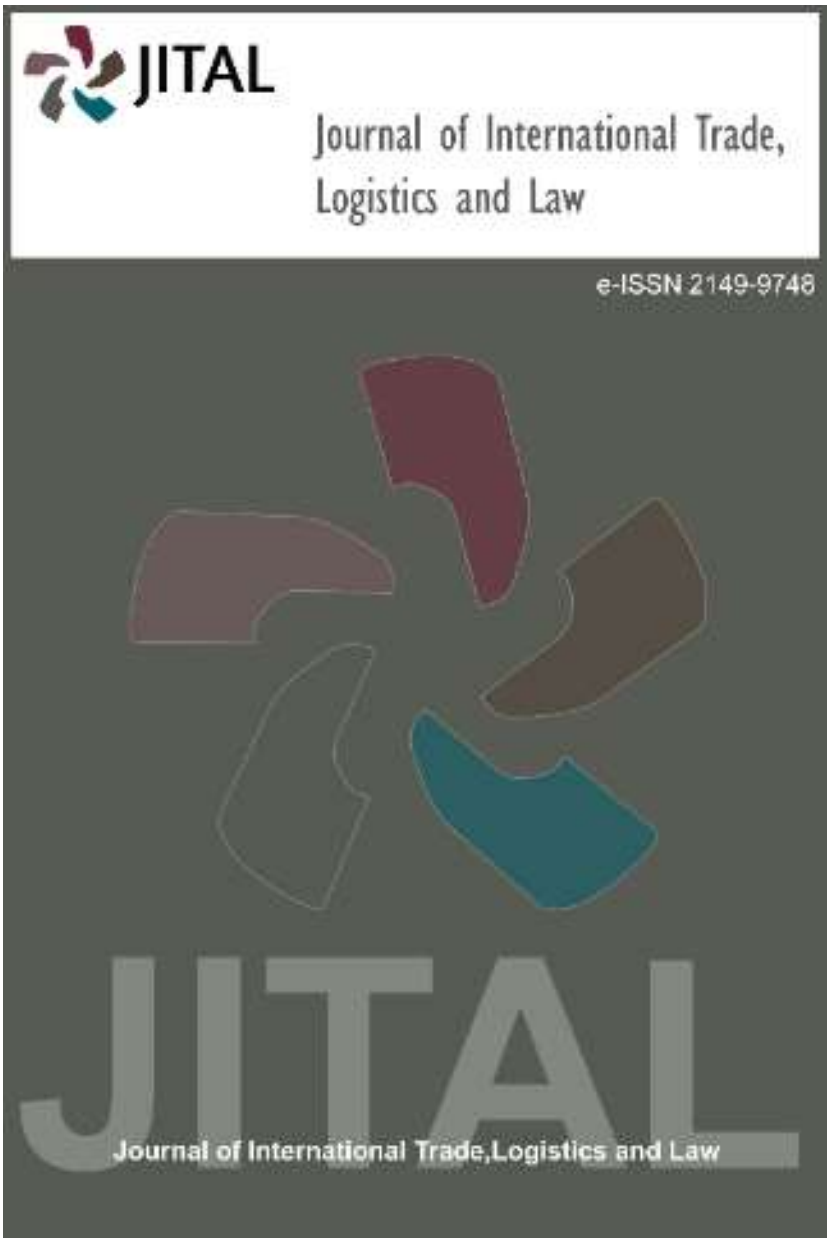

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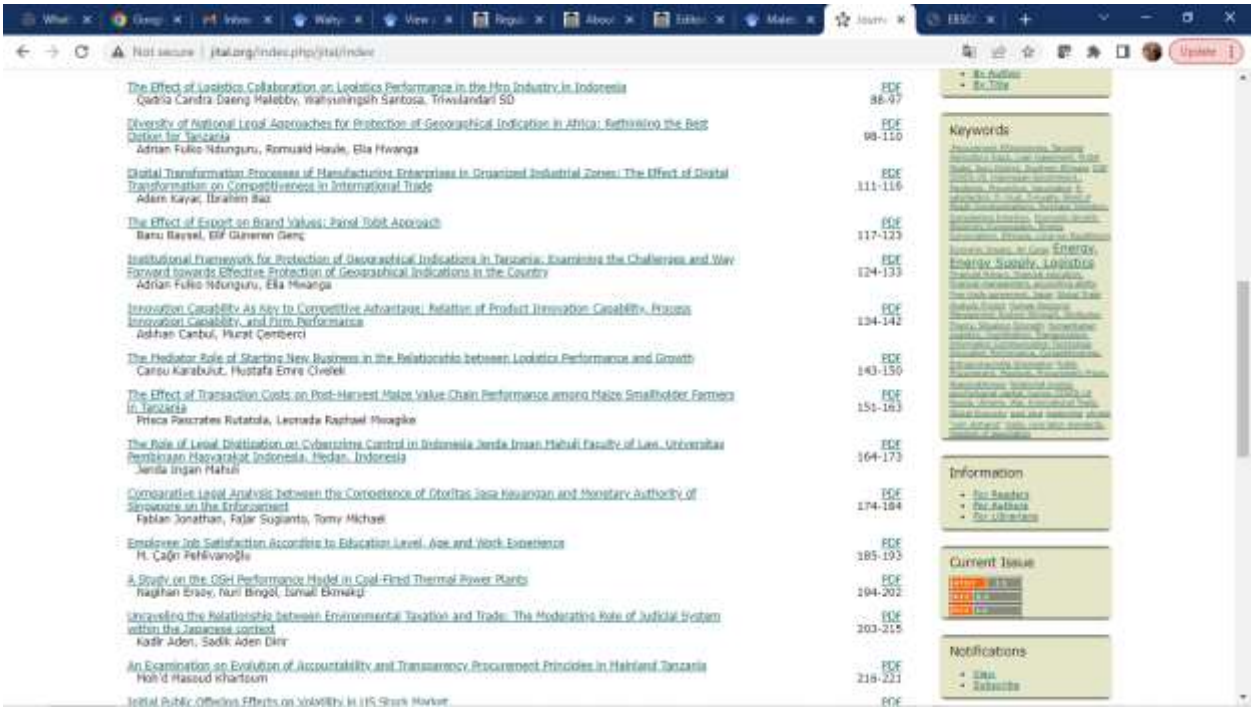

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THE EFFECT OF LOGISTICS COLLABORATION ON LOGISTICS PERFORMANCE IN THE MRO INDUSTRY IN INDONESIA

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Abstract:
This study clarifies the effect of supplier selection and information sharing on logistics performance mediated by logistics collaboration in the MRO industry in Indonesia. The independent variables used in this study were supplier selection and information sharing. Meanwhile, the logistics collaboration variable is used as a mediation variable. And the dependent variable in this study is logistical performance. The sample in this study was 123 respondents from the logistics, procurement, and purchase of aircraft parts divisions at MRO companies in Indonesia using purposive sampling techniques. The data analysis model used is the Structural Equation Model (SEM). Therefore, this study examines supplier selection, information sharing, logistics collaboration, and logistics performance in the MRO industry in Indonesia. The result of this study is that there is a positive influence of supplier selection on logistics collaboration, there is a positive influence between information sharing and logistics collaboration, there is a positive influence between logistics collaboration and logistics performance, there is a positive influence between supplier selection and logistics performance, and there is no influence between information sharing and logistics performance. The indicators in this study are adjusted to the business criteria of the MRO industry itself.

Keywords:
Aviation, MRO, Logistics, Procurement

1. Introduction

The Maintenance, Repair, and Overhaul industry, hereinafter referred to as MRO is an industry engaged in the aviation sector. In the civil aviation sector, MRO is defined as "The performance of duties necessary to ensure the continuous airworthiness of an aircraft, including any or a combination of repairs, inspections, replacements, defect repairs, and the embodiment of modifications or repairs."

The airline owns or leases its fleet, hoping that every available fleet can operate properly. But without forgetting the periodic maintenance on each of its fleets if it is on the ground. Outsourcing aircraft MRO operations to professional maintenance service providers has become a trend in the aviation industry, as the practice allows airline companies to focus on profitable passenger and cargo transportation service operations and meet the mandatory needs of aircraft MRO (Qin et al., 2020).

Due to high quality and safety standards, preventive maintenance of aircraft is essential. Demand for parts arises either when random component failures occur or when components undergo preventive maintenance over their lifetime. The aircraft industry manages a large number of high-value parts characterized by unpredictable and non-stationary demand. In addition, unique parts are characterized by a high risk of obsolescence and high shortage costs. The unpredictable demand for inventory for such parts messes up the business of long-term suppliers. Without good collaboration with the suppliers, it will be affected to waste more time and money. Global demand for spare parts,

traceability (for safety reasons), and high out-of-service (for grounded aircraft) costs all exacerbate the difficulty of efficient parts inventory management in the MRO industry (Ghadge et al., 2018).
Procurement of MRO parts that can be issued with one-time use on a single aircraft can lead to high inventory storage costs, and the process of overhauling rotatable components with long service cycles involves long lead times. In particular, some MRO parts are expensive with a long service life, which can be rotated between different aircraft after repair. On the other hand, multiple parts are for single use on a single aircraft and their service life ends after being unloaded from the aircraft. In this case, maintaining sufficient spare parts and minimizing inventory costs are very important for MRO companies (Eltoukhy et al., 2017; Ghadge et al., 2018).
Thus punctuality and cost efficiency are two major issues that exist in this MRO industry in running an aircraft maintenance and repair business. So the logistics performance that supports aircraft parts procurement activities has an important role in the operational processes in the MRO company's business process. Supplier selection and information sharing are part of a series of activities in logistics collaboration, but in this study, researchers will focus on these two independent variables as part of the logistics collaboration that MRO companies carry out in the early stages of logistics collaboration.
Supplier selection and information sharing are independent variables where researchers argue that these two activities are the starting point to achieve a good and sustainable collaboration, especially in the field of logistics procurement of aircraft parts in MRO companies. Meanwhile, logistics collaboration is one aspect of the success of logistics activities in the provision of aircraft spare parts, especially in aircraft repair and maintenance activities that have characteristics that are difficult to determine the demand.
This study will be aimed at how logistics performance is influenced by logistics collaboration as mediation, as well as supplier selection and information sharing as independent variables. This study subjected MRO running their business in Indonesia, through the association IAMSA (Indonesia Aircraft Maintenance Service Association). IAMSA has 31 memberships all around Indonesia, the questionnaires are shared through the association's secretariat.

2. Literature Review

2.1. Supplier Selection

This supplier selection process begins with the identification of the needs that the company has as a potential buyer and the prospective supplier will provide information that can be offered (Ograh et al., 2021). The buyer will evaluate the supplier by several criteria (Aharonovitz et al., 2018). Regulation is a mandatory criterion for the evaluation of any supplier and can essentially be considered a risk mitigation activity in addition to the operator's assessment (Holkeri, 2020). So it can be concluded that this supplier selection process is an important part of subsequent activities so that the company gets supplies that meet the required criteria and can avoid losses or losses in the future in logistics activities that can result in the core business of the MRO industry, namely aircraft repair, and maintenance. Quality control of the required supply can also be started from this process, to then be evaluated regarding the supply received later, especially for MRO companies.

2.2. Information Sharing

Information sharing is believed to be beneficial for decision-making in the supply chain as well as company success (Lai et al., 2020). Not only aiming to improve the performance of a company but sharing this information is also useful in collaborative activities between buyers and suppliers. The more intensely companies share information with their suppliers, the more the company's ability will increase. The existence of information-sharing activities with collaborating partners can also improve company performance (Kirono et al., 2019). As well as managing complex supply chains, companies can integrate sharing of this information between partners to reduce unnecessary spending in collaboration (Lai et al., 2020). This information-sharing activity is useful not only within the company, but it can also be useful for external companies, especially in collaboration with suppliers or other partners who work with the company. In addition to achieving common goals, effective information sharing can also

2.3. Logistic Collaboration

Collaboration refers to two or more parties working together by integrating and sharing information in their business processes and improving shared performance (Lai et al., 2020). Collaboration can lead to improved performance in the supply chain. Companies build collaborative relationships with their supply chain partners to achieve efficiency,

flexibility, and sustainable competitive advantage that ultimately leads to improved company performance (Kirono et al., 2019). Therefore, collaboration in the supply chain sector, especially for logistics activities, is needed, in addition to improving the performance of each collaborating company as well as sharing risks and increasing efficiency, flexibility, and achieving sustainable competitive advantages. And with this collaborative activity in logistics, the MRO company will also get supplies of both spare parts, components, or logistical support needed for the company's core business.

2.4. Logistic Performance

Logistics performance indicators and criteria include cost, time, and reliability, which can be used to measure the performance of logistics operations among partners in the supply chain. (Aharonovitz et al., 2018). Logistics is one of the main sectors of economic development because the performance of logistics directly affects growth and development (Karaduman et al., 2020).

Several specific criteria are very important, including on-time delivery, lead time, error-free delivery, scheduled delivery fulfillment, order filling rate, broken orders, urgent order delivery, delivery in periods of high demand, short transit times, availability of cargo space, vehicle, and container conditions (Aharonovitz et al., 2018). It can be concluded that logistics performance is the result of measuring the index of logistics activities located in an enterprise and even a country. The results obtained from logistics activities in a company, in this study logistics performance can be measured through how logistics activities can support the core business of the MRO company in carrying out repairs and maintenance of aircraft that require the availability of aircraft parts or components.

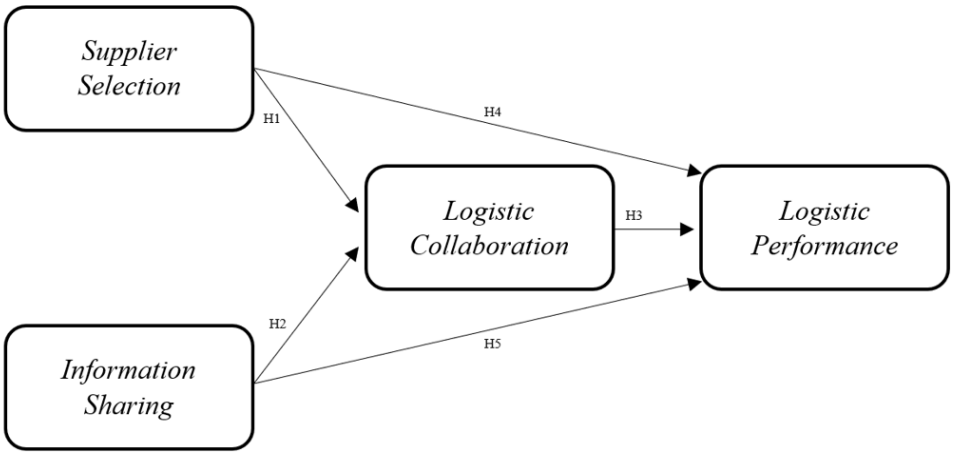

Figure 1: Research Framework
Source: author's description

3. Hypotheses Development

3.1. Supplier Selection and Logistic Collaboration

To achieve collaboration, companies must select the optimal suppliers by aligning their needs and capabilities between organizations (Aharonovitz et al., 2018). Companies can no longer be limited to their resources; They must cross boundaries to find suppliers with specific capabilities that meet their needs and that help them achieve responsiveness through coordination, flexibility, and collaborative capabilities between organizations. Of course, in the world of aviation, as explained earlier, regulation is very much a necessity in every aspect of its operations, including spare parts needed in the process of aircraft maintenance and repair. For the parts needed by the MRO company to meet the categories of regulations, the company must choose suppliers that are also within the standards of the applicable regulations.

H1. There is a positive influence between supplier selection and logistics collaboration.

3.2. Information-sharing and Logistic Collaboration

Information related to logistics activities should be shared within and across organizational boundaries to facilitate decision-making with logistics partners (Lai et al., 2020). Shared decision-making has been defined as the process by which supply chain partners coordinate activities in supply chain planning and operations to maximize supply chain performance. It generally refers to planning, integrating information, solving problems, and developing rules and regulations, and procedures (Shahbaz et al., 2018). Given that companies cannot survive without collaboration along the supply chain, the sharing and integration of logistics information has been considered an important driver of shared decision-making, which in turn improves the performance of logistics services and the performance of organizations (Viet et al., 2018)

H2. There is a positive influence between information sharing and logistics collaboration

3.3. Logistic Collaboration and Logistic Performance

The results showed that IS and collaboration partially affect supply chain performance. The existence of collaboration can improve company performance (Kirono et al., 2019). Classify supply chain collaboration into strategic systems and collaborations. Both system collaboration and strategic collaboration were found to have a positive impact on supply chain responsiveness, whereas the impact of collaboration on market performance was mediated by supply chain responsiveness (Lai et al., 2020). With the speed of delivery of spare parts with this logistics collaboration, researchers argue that there will be a positive influence on the relationship of this logistics collaboration variable with logistics performance in MRO companies.

H3. There is a positive influence between logistics collaboration and logistics performance.

3.4. Supplier Selection and Logistic Performance

The ability of suppliers affects the reduction of costs, profitability, and flexibility of buyers, as well as their responsiveness to market changes. In addition, partners who connect their capabilities are likely to see their performance improve. For logistics managers, ensuring that suppliers can offer the necessary capabilities is critical to achieving a high level of service. The relevance of the selection of effective suppliers shows that logistics customer service greatly affects operational and marketing performance (Aharonovitz et al., 2018). Thus, with the selection of the right supplier, the researcher argues that there is a relationship between the supplier selection variable and the logistics performance in the MRO company.

H4. There is a positive influence between supplier selection and logistics performance.

3.5. Information Sharing and Logistic Performance

Sharing information with supply chain members includes the exchange of information on operations management (e.g. material flow, order entry, shipping, billing) as well as the exchange of estimates and plans (Gelderman et al., 2020). There is an influence of integration/collaboration on information sharing and supply chain performance as well as the role of information sharing in achieving performance. Examine the relationship between collaboration, information sharing, and supply chain performance. The results showed that information sharing and collaboration partially affect supply chain performance (Kirono et al., 2019).

H5. There is a positive influence on information sharing and logistics performance.

4. Methodology

The data used in this study is cross-sectional data on MRO companies in Indonesia. This study analyzes the variables of supplier selection and information sharing as independent variables, logistic collaboration as mediating variables (Intervening Variables), and logistics performance as dependent variables.

Questionnaires created using google Forms are distributed via email, Linkedin, and WhatsApp. And the answer to the respondent will go on the google spreadsheet data. This study sample refers to the assumption of 5 x n (observed variables/indicators) (Hair et al., 2019). This study consisted of 28 statement indicators, then 5 x 28 = 140 samples were needed. However, in the limited time and source of respondents, the total number of respondents who managed to get was 123 respondents. The characteristics of respondents in this study include gender, age of respondents, respondents' occupation, and respondent's length of service.

Table 1. Demographic Characteristics by Gender

Respondents' Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	84	68.3	68.3	68.3
	Female	39	31.7	31.7	100.0
	Total	123	100.0	100.0	

Source: SPSS Ver. 26

Table 2. Demographic Characteristics by Age

Respondents' Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	>50 Years Old	7	5.7	5.7	5.7
	20-30 Years Old	63	51.2	51.2	56.9
	31-40 Years Old	51	41.5	41.5	98.4
	41-50 Years Old	2	1.6	1.6	100.0
	Total	123	100.0	100.0	

Source: SPSS Ver. 26

Table 3. Demographic Characteristics by Occupation

Respondents' Occupation					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Manager	19	15.4	15.4	15.4
	Senior Manager	5	4.1	4.1	19.5
	Staff	88	71.5	71.5	91.1
	Supervisor	11	8.9	8.9	100.0
	Total	123	100.0	100.0	

Source: SPSS Ver. 26

Table 3. Demographic Characteristics by Length of Service

Respondents' Occupation					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	< 5 years	31	25.2	25.2	25.2
	>15 years	9	7.3	7.3	32.5
	10 - 15 years	10	8.1	8.1	40.7
	5 - 10 years	73	59.3	59.3	100.0
	Total	123	100.0	100.0	

Source: SPSS Ver. 26

5. Data Analysis

5.1. Goodness-of-fit

Testing with the SEM model is carried out in stages. If the right model has not been obtained, then the previous model needs to be revised. The importance of revising the SEM model arises due to the presence of problems from the analysis process. A problem that may arise is the problem regarding the inability of the developed model to produce unique estimates. If the problem arises in the SEM analysis, it can be identified that the study does not support the structural model formed. Thus the model needs to be revised by developing existing theories to form a new one. The results of the goodness-of-fit test using AMOS software version 24.

Based on the results of testing the feasibility of the model, it was found that based on the value of Sig. Prob., RMSEA, and CMIN/DF, a goodness-of-fit model was concluded. Therefore, the testing of theoretical hypotheses can continue. Therefore, the testing of theoretical hypotheses can continue. Of the several model feasibility tests, the

model is said to be feasible if at least one of the model feasibility test methods is met (Hair et al., 2019). In an empirical study, a researcher is not required to meet all goodness-of-fit criteria but depends on the judgment of each researcher.

5.2. Validity and Reliability

Table 4. Validity Results

Supplier Selection			Logistic Collaboration		
SS_1	0.662	Valid	LC_1	0.809	Valid
SS_2	0.697	Valid	LC_2	0.780	Valid
SS_3	0.643	Valid	LC_3	0.653	Valid
SS_4	0.690	Valid	LC_4	0.710	Valid
SS_5	0.638	Valid	LC_5	0.526	Valid
SS_6	0.548	Valid	LC_6	0.781	Valid
SS_7	0.658	Valid	LC_7	0.751	Valid
Information Sharing			Logistic Performance		
IS_1	0.644	Valid	LP_1	0.747	Valid
IS_2	0.706	Valid	LP_2	0.796	Valid
IS_3	0.687	Valid	LP_3	0.604	Valid
IS_4	0.719	Valid	LP_4	0.821	Valid
IS_5	0.694	Valid	LP_5	0.839	Valid
IS_6	0.775	Valid	LP_6	0.618	Valid
IS_7	0.651	Valid	LP_7	0.725	Valid

Source: SPSS Ver. 26

Based on table 4 validity tests for all instruments of the Variable can be said to be valid based on the value of the loading factor > 0.50. In other words, these statements have internal consistency so that they can form the construct of each of these variables.

As for the basic reliability test of decision making, if Cronbach's coefficient Alpha ≥ 0.60 then the statement in the questionnaire is feasible to use (construct reliable). Whereas if Cronbach coefficient alpha < 0.60 then the statements in the questionnaire are not worth using (construct unreliable).

Table 5. Reliability Results

Variable	Coefficient Cronbach's Alpha	Decision
Supplier Selection	0.721	Reliable
Information Sharing	0.821	Reliable
Logistic Collaboration	0.836	Reliable
Logistic Performance	0.851	Reliable

Source: SPSS Ver. 26

Based on the reliability test table above, it can be said to be reliable based on Cronbach's Alpha value ≥ 0.60. In other words, these statements have internal consistency so that they can form the construct of each of these variables.

6. Hypotheses Testing

Hypothesis testing is used to determine the presence or absence of influence between independent variables and dependent variables. H0: variables that affect, have no significant effect on the variables affected H1: variables that affect, have a significant effect on the variables affected. The basis for making the decision is if the probability (significance) $\alpha > 0.05$ then H0 is supported, while if the probability (significance) $\alpha < 0.05$ then Ha is supported.

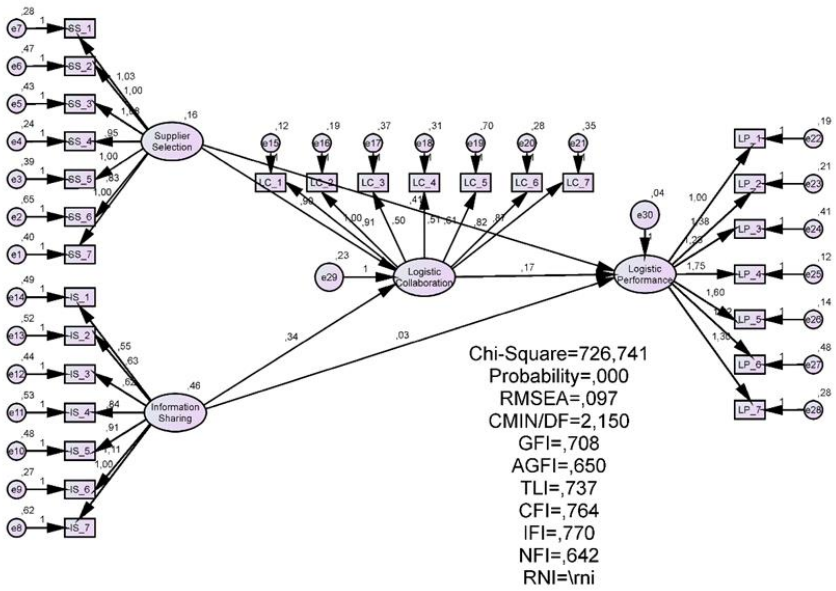

Figure 2. Hypotheses Test Results
Source: AMOS Ver. 24

Table 6. Hypotheses Results

Hypotheses	Estimate	P-Value one tail	Decision
H1. There is a positive influence between supplier selection and logistics collaboration	,897	0.000	Supported
H2. There is a positive influence between information sharing and logistics collaboration	,342	0.000	Supported
H3. There is a positive influence between logistics collaboration and logistics performance	,175	0.003	Supported
H4. There is a positive influence between supplier selection and logistics performance	,415	0.001	Supported

H5. There is a positive influence on information sharing and logistics performance	,028	0.262	Not Supported

Source: AMOS Ver. 24

Based on table 6 the results of the hypothesis test can be concluded as follows;
In hypothesis 1, it is known that the size of the estimate of supplier selection with logistics collaboration is 0.897, meaning that the higher the perception of supplier selection, the higher the perception of logistics collaboration. The test results showed a p-value of 0.000 < 0.05 (alpha 5%) so it was concluded statistically at a 95 percent confidence level that there was a significant positive influence between supplier selection and logistics collaboration, this is in accordance with the hypothesis proposed. The P-Value <0.05 so that H1 is supported, which means that supplier selection has a positive and significant effect on logistics collaboration in the MRO industry in Indonesia.
In hypothesis 2, it is known that the estimated amount of information sharing with logistics collaboration is 0.342, meaning that the higher the perception of information sharing, the higher the perception of logistics collaboration. The test results showed a p-value of 0.000 > 0.05 (alpha 5%) so it was concluded statistically at a 95 percent confidence level that there was a positive influence between sharing information on logistics collaboration, this is in accordance with the hypothesis proposed. The P-Value <0.05 so that H2 is supported, which means that information-sharing activities have a positive and significant effect on logistics collaboration in the MRO industry in Indonesia.
In hypothesis 3, it is known that the size of the estimate of logistics collaboration has a positive effect on logistics performance is 0.175, meaning that the higher the perception of logistics collaboration, the higher the perception of logistics performance. The test results showed a p-value of 0.003 < 0.05 (alpha 5%) so it was concluded statistically at a 95 percent confidence level that there was a significant positive influence between logistics collaboration on logistics performance, this is in accordance with the hypothesis proposed. The P-Value <0.05 so that H3 is supported, which means that logistics collaboration has a positive and significant effect on logistics performance in the MRO industry in Indonesia.
In hypothesis 4, it is known that the size of the estimate of supplier selection with logistics performance is 0.415, meaning that the higher the perception of supplier selection, the higher the perception of logistics performance. The test results showed a p-value of 0.001 < 0.05 (alpha 5%) so it was concluded statistically at a 95 percent confidence level that there was a significant positive influence between supplier selection on logistics performance, this is in accordance with the hypothesis proposed. The P-Value <0.05 so that H4 is supported, which means supplier selection has a positive and significant effect on logistics performance in the MRO industry in Indonesia.
In hypothesis 5, it is known that the estimated amount of information sharing with logistics performance is 0.028, meaning that the higher the perception of information sharing, the higher the perception of logistics performance. The test results showed a p-value of >0.5 then the hypothesis was rejected.

7. Discussion

So it can be concluded that the results of the research on the influence of supplier selection and information sharing on logistics performance with logistics collaboration as a mediating variable in the MRO Industry in Indonesia are as follows:
H1: There is a positive influence between supplier selection and logistics collaboration.
It can be seen in the results, the selection of suppliers has a positive effect on logistics collaboration. With the resulting estimation value, the relationship between supplier selection strongly affects logistics collaboration. So in another sense, the selection of the right supplier for the MRO company can have a significant increase in their logistics collaboration. Supplier selection is an important activity in the early stages of logistics collaboration with companies in the MRO industry in Indonesia, in this study stated that supplier commitment is an important indicator to be able to choose suppliers that suit the company's needs to achieve a good collaboration in the future.
H2: There is a positive influence between information sharing and logistics collaboration.
Based on the results of statistical testing, information-sharing has a positive effect on logistics collaboration. With the resulting estimation value, the relationship between information-sharing activities affects logistics collaboration quite

strongly. Information-sharing activities in logistics collaboration with companies in the MRO industry in Indonesia are also important, but in this case, of course, there are limits to the information that can be shared. Based on the results of the statement indicators, sharing information through electronic media is an important thing that MRO companies need in increasing collaboration with their partners. With information-sharing activities, it is hoped that the cooperative relationship between MRO companies and their partners can make good and sustainable cooperation to be able to support the operational activities of their respective companies, especially in logistics activities.

H3: There is a positive influence between logistics collaboration and logistics performance.

Based on the resulting estimation value, the relationship between logistic collaboration affects logistics performance quite weakly. The existence of logistics collaboration in companies in the MRO industry in Indonesia affects increasing the company's logistics performance. It can be seen from this research how the company's logistics collaboration with its partners can improve the logistics performance of MRO companies in the core business.

H4: There is a positive influence between supplier selection and logistics performance.

Based on the results of statistical testing, with the resulting estimation value, the relationship between supplier selection strongly affects logistics performance. The right supplier selection can improve good logistics performance for companies in the MRO industry in Indonesia. That means this supplier selection activity affects the overall results of the company's logistics performance. It can be said that this activity has an important effect on the logical activities of companies, especially MRO companies, in which case researchers conduct research in Indonesia.

H5: There is no influence between information sharing and logistics performance.

Based on the results of the hypothesis test, states that information-sharing does not affect logistics performance in MRO companies in Indonesia.

8. Conclusion

Based on the results of research and discussion obtained from the previous chapters, it can be concluded that:

- Supplier selection activities have a positive and significant effect on logistics collaboration in the MRO industry in Indonesia.
- Information-sharing activities with company partners have a positive and significant effect on logistics collaboration in the MRO industry in Indonesia.
- Logistics collaboration has a positive and significant effect on logistics performance in the MRO industry in Indonesia.
- Supplier selection activities have a positive and significant effect on logistics performance in the MRO industry in Indonesia.
- More information-sharing activities carried out will not always have a good influence on logistics performance, such as some information that is not related to logistics activities also cannot support the increasing logistics performance in the company. However, information-sharing activities with company partners do not affect the performance of logistics in the MRO industry in Indonesia.

9. Managerial Implications

The results of this study have implications that can be considered for the management of companies in the MRO industry in Indonesia to be able to improve logistics performance. Based on this research, it is proven that the initial stages of logistics collaboration such as supplier selection and information sharing are important things that can improve logistics performance in the end. Especially in the MRO industry where the supply of spare parts and components is needed in aircraft maintenance and maintenance. However, it can also be concluded that information-sharing activities in MRO companies have proven to have no direct effect on logistics performance, which means that information-sharing activities can still be carried out but within certain limits in providing information. Only information that focuses on logistics activities is needed.

10. Final Considerations and Limitations

This research is limited to sharing information that occurs from MRO companies with their partners, not researching information-sharing activities internally in the company. There is no indirect relationship between supplier selection

and information sharing on logistics performance mediated by logistics collaboration in the MRO industry in Indonesia.

Based on the limitations above, the researcher's suggestions for further research progress are research can be carried out with the relationship of information sharing activities divided into 2 parts, namely information sharing activities internally and externally in the company.

And further research can conduct research with additional hypotheses for the indirect relationship between supplier selection and information sharing on logistics performance mediated by logistics collaboration in the MRO industry in Indonesia.

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THE EFFECT OF LOGISTICS COLLABORATION ON LOGISTICS PERFORMANCE IN THE MRO INDUSTRY IN INDONESIA

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THE EFFECT OF LOGISTICS COLLABORATION ON LOGISTICS PERFORMANCE IN THE MRO INDUSTRY IN INDONESIA

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Abstract:
This study clarifies the effect of supplier selection and information sharing on logistics performance mediated by logistics collaboration in the MRO industry in Indonesia. The independent variables used in this study were supplier selection and information sharing. Meanwhile, the logistics collaboration variable is used as a mediation variable. And the dependent variable in this study is logistical performance. The sample in this study was 123 respondents from the logistics, procurement, and purchase of aircraft parts divisions at MRO companies in Indonesia using purposive sampling techniques. The data analysis model used is the Structural Equation Model (SEM). Therefore, this study examines supplier selection, information sharing, logistics collaboration, and logistics performance in the MRO industry in Indonesia. The result of this study is that there is a positive influence of supplier selection on logistics collaboration, there is a positive influence between information sharing and logistics collaboration, there is a positive influence between logistics collaboration and logistics performance, there is a positive influence between supplier selection and logistics performance, and there is no influence between information sharing and logistics performance. The indicators in this study are adjusted to the business criteria of the MRO industry itself.

Keywords:
Aviation, MRO, Logistics, Procurement

1. Introduction

The Maintenance, Repair, and Overhaul industry, hereinafter referred to as MRO is an industry engaged in the aviation sector. In the civil aviation sector, MRO is defined as "The performance of duties necessary to ensure the continuous airworthiness of an aircraft, including any or a combination of repairs, inspections, replacements, defect repairs, and the embodiment of modifications or repairs."

The airline owns or leases its fleet, hoping that every available fleet can operate properly. But without forgetting the periodic maintenance on each of its fleets if it is on the ground. Outsourcing aircraft MRO operations to professional maintenance service providers has become a trend in the aviation industry, as the practice allows airline companies to focus on profitable passenger and cargo transportation service operations and meet the mandatory needs of aircraft MRO (Qin et al., 2020).

Due to high quality and safety standards, preventive maintenance of aircraft is essential. Demand for parts arises either when random component failures occur or when components undergo preventive maintenance over their lifetime. The aircraft industry manages a large number of high-value parts characterized by unpredictable and non-stationary demand. In addition, unique parts are characterized by a high risk of obsolescence and high shortage costs. The unpredictable demand for inventory for such parts messes up the business of long-term suppliers. Without good collaboration with the suppliers, it will be affected to waste more time and money. Global demand for spare parts,

traceability (for safety reasons), and high out-of-service (for grounded aircraft) costs all exacerbate the difficulty of efficient parts inventory management in the MRO industry (Ghadge et al., 2018).

Procurement of MRO parts that can be issued with one-time use on a single aircraft can lead to high inventory storage costs, and the process of overhauling rotatable components with long service cycles involves long lead times. In particular, some MRO parts are expensive with a long service life, which can be rotated between different aircraft after repair. On the other hand, multiple parts are for single use on a single aircraft and their service life ends after being unloaded from the aircraft. In this case, maintaining sufficient spare parts and minimizing inventory costs are very important for MRO companies (Eltoukhy et al., 2017; Ghadge et al., 2018).

Thus punctuality and cost efficiency are two major issues that exist in this MRO industry in running an aircraft maintenance and repair business. So the logistics performance that supports aircraft parts procurement activities has an important role in the operational processes in the MRO company's business process. Supplier selection and information sharing are part of a series of activities in logistics collaboration, but in this study, researchers will focus on these two independent variables as part of the logistics collaboration that MRO companies carry out in the early stages of logistics collaboration.

Supplier selection and information sharing are independent variables where researchers argue that these two activities are the starting point to achieve a good and sustainable collaboration, especially in the field of logistics procurement of aircraft parts in MRO companies. Meanwhile, logistics collaboration is one aspect of the success of logistics activities in the provision of aircraft spare parts, especially in aircraft repair and maintenance activities that have characteristics that are difficult to determine the demand.

This study will be aimed at how logistics performance is influenced by logistics collaboration as mediation, as well as supplier selection and information sharing as independent variables. This study subjected MRO running their business in Indonesia, through the association IAMSA (Indonesia Aircraft Maintenance Service Association). IAMSA has 31 memberships all around Indonesia, the questionnaires are shared through the association's secretariat.

2. Literature Review

2.1. Supplier Selection

This supplier selection process begins with the identification of the needs that the company has as a potential buyer and the prospective supplier will provide information that can be offered (Ograh et al., 2021). The buyer will evaluate the supplier by several criteria (Aharonovitz et al., 2018). Regulation is a mandatory criterion for the evaluation of any supplier and can essentially be considered a risk mitigation activity in addition to the operator's assessment (Holkeri, 2020). So it can be concluded that this supplier selection process is an important part of subsequent activities so that the company gets supplies that meet the required criteria and can avoid losses or losses in the future in logistics activities that can result in the core business of the MRO industry, namely aircraft repair, and maintenance. Quality control of the required supply can also be started from this process, to then be evaluated regarding the supply received later, especially for MRO companies.

2.2. Information Sharing

Information sharing is believed to be beneficial for decision-making in the supply chain as well as company success (Lai et al., 2020). Not only aiming to improve the performance of a company but sharing this information is also useful in collaborative activities between buyers and suppliers. The more intensely companies share information with their suppliers, the more the company's ability will increase. The existence of information-sharing activities with collaborating partners can also improve company performance (Kirono et al., 2019). As well as managing complex supply chains, companies can integrate sharing of this information between partners to reduce unnecessary spending in collaboration (Lai et al., 2020). This information-sharing activity is useful not only within the company, but it can also be useful for external companies, especially in collaboration with suppliers or other partners who work with the company. In addition to achieving common goals, effective information sharing can also

2.3. Logistic Collaboration

Collaboration refers to two or more parties working together by integrating and sharing information in their business processes and improving shared performance (Lai et al., 2020). Collaboration can lead to improved performance in the supply chain. Companies build collaborative relationships with their supply chain partners to achieve efficiency,

flexibility, and sustainable competitive advantage that ultimately leads to improved company performance (Kirono et al., 2019). Therefore, collaboration in the supply chain sector, especially for logistics activities, is needed, in addition to improving the performance of each collaborating company as well as sharing risks and increasing efficiency, flexibility, and achieving sustainable competitive advantages. And with this collaborative activity in logistics, the MRO company will also get supplies of both spare parts, components, or logistical support needed for the company's core business.

2.4. Logistic Performance

Logistics performance indicators and criteria include cost, time, and reliability, which can be used to measure the performance of logistics operations among partners in the supply chain. (Aharonovitz et al., 2018). Logistics is one of the main sectors of economic development because the performance of logistics directly affects growth and development (Karaduman et al., 2020).

Several specific criteria are very important, including on-time delivery, lead time, error-free delivery, scheduled delivery fulfillment, order filling rate, broken orders, urgent order delivery, delivery in periods of high demand, short transit times, availability of cargo space, vehicle, and container conditions (Aharonovitz et al., 2018). It can be concluded that logistics performance is the result of measuring the index of logistics activities located in an enterprise and even a country. The results obtained from logistics activities in a company, in this study logistics performance can be measured through how logistics activities can support the core business of the MRO company in carrying out repairs and maintenance of aircraft that require the availability of aircraft parts or components.

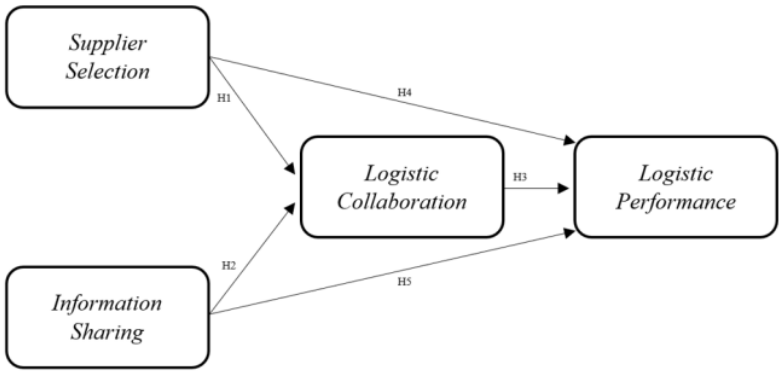

Figure 1: Research Framework
Source: author's description

3. Hypotheses Development

3.1. Supplier Selection and Logistic Collaboration

To achieve collaboration, companies must select the optimal suppliers by aligning their needs and capabilities between organizations (Aharonovitz et al., 2018). Companies can no longer be limited to their resources; They must cross boundaries to find suppliers with specific capabilities that meet their needs and that help them achieve responsiveness through coordination, flexibility, and collaborative capabilities between organizations. Of course, in the world of aviation, as explained earlier, regulation is very much a necessity in every aspect of its operations, including spare parts needed in the process of aircraft maintenance and repair. For the parts needed by the MRO company to meet the categories of regulations, the company must choose suppliers that are also within the standards of the applicable regulations.

H1. There is a positive influence between supplier selection and logistics collaboration.

3.2. Information-sharing and Logistic Collaboration

Information related to logistics activities should be shared within and across organizational boundaries to facilitate decision-making with logistics partners (Lai et al., 2020). Shared decision-making has been defined as the process by which supply chain partners coordinate activities in supply chain planning and operations to maximize supply chain performance. It generally refers to planning, integrating information, solving problems, and developing rules and regulations, and procedures (Shahbaz et al., 2018). Given that companies cannot survive without collaboration along the supply chain, the sharing and integration of logistics information has been considered an important driver of shared decision-making, which in turn improves the performance of logistics services and the performance of organizations (Viet et al., 2018)

H2. There is a positive influence between information sharing and logistics collaboration

3.3. Logistic Collaboration and Logistic Performance

The results showed that IS and collaboration partially affect supply chain performance. The existence of collaboration can improve company performance (Kirono et al., 2019). Classify supply chain collaboration into strategic systems and collaborations. Both system collaboration and strategic collaboration were found to have a positive impact on supply chain responsiveness, whereas the impact of collaboration on market performance was mediated by supply chain responsiveness (Lai et al., 2020). With the speed of delivery of spare parts with this logistics collaboration, researchers argue that there will be a positive influence on the relationship of this logistics collaboration variable with logistics performance in MRO companies.

H3. There is a positive influence between logistics collaboration and logistics performance.

3.4. Supplier Selection and Logistic Performance

The ability of suppliers affects the reduction of costs, profitability, and flexibility of buyers, as well as their responsiveness to market changes. In addition, partners who connect their capabilities are likely to see their performance improve. For logistics managers, ensuring that suppliers can offer the necessary capabilities is critical to achieving a high level of service. The relevance of the selection of effective suppliers shows that logistics customer service greatly affects operational and marketing performance (Aharonovitz et al., 2018). Thus, with the selection of the right supplier, the researcher argues that there is a relationship between the supplier selection variable and the logistics performance in the MRO company.

H4. There is a positive influence between supplier selection and logistics performance.

3.5. Information Sharing and Logistic Performance

Sharing information with supply chain members includes the exchange of information on operations management (e.g. material flow, order entry, shipping, billing) as well as the exchange of estimates and plans (Gelderman et al., 2020). There is an influence of integration/collaboration on information sharing and supply chain performance as well as the role of information sharing in achieving performance. Examine the relationship between collaboration, information sharing, and supply chain performance. The results showed that information sharing and collaboration partially affect supply chain performance (Kirono et al., 2019).

H5. There is a positive influence on information sharing and logistics performance.

4. Methodology

The data used in this study is cross-sectional data on MRO companies in Indonesia. This study analyzes the variables of supplier selection and information sharing as independent variables, logistic collaboration as mediating variables (Intervening Variables), and logistics performance as dependent variables.

Questionnaires created using google Forms are distributed via email, Linkedin, and WhatsApp. And the answer to the respondent will go on the google spreadsheet data. This study sample refers to the assumption of 5 x n (observed variables/indicators) (Hair et al., 2019). This study consisted of 28 statement indicators, then 5 x 28 = 140 samples were needed. However, in the limited time and source of respondents, the total number of respondents who managed to get was 123 respondents. The characteristics of respondents in this study include gender, age of respondents, respondents' occupation, and respondent's length of service.

Table 1. Demographic Characteristics by Gender

Respondents' Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	84	68.3	68.3	68.3
	Female	39	31.7	31.7	100.0
	Total	123	100.0	100.0	

Source: SPSS Ver. 26

Table 2. Demographic Characteristics by Age

Respondents' Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	>50 Years Old	7	5.7	5.7	5.7
	20-30 Years Old	63	51.2	51.2	56.9
	31-40 Years Old	51	41.5	41.5	98.4
	41-50 Years Old	2	1.6	1.6	100.0
	Total	123	100.0	100.0	

Source: SPSS Ver. 26

Table 3. Demographic Characteristics by Occupation

Respondents' Occupation					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Manager	19	15.4	15.4	15.4
	Senior Manager	5	4.1	4.1	19.5
	Staff	88	71.5	71.5	91.1
	Supervisor	11	8.9	8.9	100.0
	Total	123	100.0	100.0	

Source: SPSS Ver. 26

Table 3. Demographic Characteristics by Length of Service

Respondents' Occupation					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	< 5 years	31	25.2	25.2	25.2
	>15 years	9	7.3	7.3	32.5
	10 - 15 years	10	8.1	8.1	40.7
	5 - 10 years	73	59.3	59.3	100.0
	Total	123	100.0	100.0	

Source: SPSS Ver. 26

5. Data Analysis

5.1. Goodness-of-fit

Testing with the SEM model is carried out in stages. If the right model has not been obtained, then the previous model needs to be revised. The importance of revising the SEM model arises due to the presence of problems from the analysis process. A problem that may arise is the problem regarding the inability of the developed model to produce unique estimates. If the problem arises in the SEM analysis, it can be identified that the study does not support the structural model formed. Thus the model needs to be revised by developing existing theories to form a new one. The results of the goodness-of-fit test using AMOS software version 24.

Based on the results of testing the feasibility of the model, it was found that based on the value of Sig. Prob., RMSEA, and CMIN/DF, a goodness-of-fit model was concluded. Therefore, the testing of theoretical hypotheses can continue. Therefore, the testing of theoretical hypotheses can continue. Of the several model feasibility tests, the

model is said to be feasible if at least one of the model feasibility test methods is met (Hair et al., 2019). In an empirical study, a researcher is not required to meet all goodness-of-fit criteria but depends on the judgment of each researcher.

5.2. Validity and Reliability

Table 4. Validity Results

Supplier Selection			Logistic Collaboration		
SS_1	0.662	Valid	LC_1	0.809	Valid
SS_2	0.697	Valid	LC_2	0.780	Valid
SS_3	0.643	Valid	LC_3	0.653	Valid
SS_4	0.690	Valid	LC_4	0.710	Valid
SS_5	0.638	Valid	LC_5	0.526	Valid
SS_6	0.548	Valid	LC_6	0.781	Valid
SS_7	0.658	Valid	LC_7	0.751	Valid
Information Sharing			Logistic Performance		
IS_1	0.644	Valid	LP_1	0.747	Valid
IS_2	0.706	Valid	LP_2	0.796	Valid
IS_3	0.687	Valid	LP_3	0.604	Valid
IS_4	0.719	Valid	LP_4	0.821	Valid
IS_5	0.694	Valid	LP_5	0.839	Valid
IS_6	0.775	Valid	LP_6	0.618	Valid
IS_7	0.651	Valid	LP_7	0.725	Valid

Source: SPSS Ver. 26

Based on table 4 validity tests for all instruments of the Variable can be said to be valid based on the value of the loading factor > 0.50. In other words, these statements have internal consistency so that they can form the construct of each of these variables.

As for the basic reliability test of decision making, if Cronbach's coefficient Alpha ≥ 0.60 then the statement in the questionnaire is feasible to use (construct reliable). Whereas if Cronbach coefficient alpha < 0.60 then the statements in the questionnaire are not worth using (construct unreliable).

Table 5. Reliability Results

Variable	Coefficient Cronbach's Alpha	Decision
Supplier Selection	0.721	Reliable
Information Sharing	0.821	Reliable
Logistic Collaboration	0.836	Reliable
Logistic Performance	0.851	Reliable

Source: SPSS Ver. 26

Based on the reliability test table above, it can be said to be reliable based on Cronbach's Alpha value ≥ 0.60. In other words, these statements have internal consistency so that they can form the construct of each of these variables.

6. Hypotheses Testing

Hypothesis testing is used to determine the presence or absence of influence between independent variables and dependent variables. H0: variables that affect, have no significant effect on the variables affected H1: variables that affect, have a significant effect on the variables affected. The basis for making the decision is if the probability (significance) $\alpha > 0.05$ then H0 is supported, while if the probability (significance) $\alpha < 0.05$ then Ha is supported.

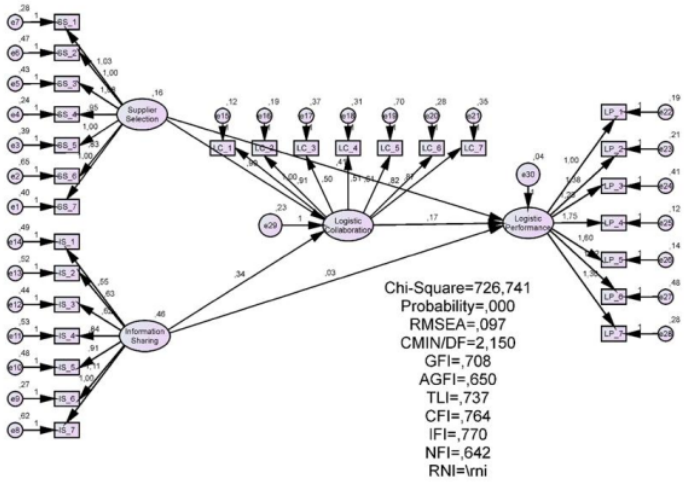

Figure 2. Hypotheses Test Results
Source: AMOS Ver. 24

Table 6. Hypotheses Results

Hypotheses	Estimate	P-Value one tail	Decision
H1. There is a positive influence between supplier selection and logistics collaboration	,897	0.000	Supported
H2. There is a positive influence between information sharing and logistics collaboration	,342	0.000	Supported
H3. There is a positive influence between logistics collaboration and logistics performance	,175	0.003	Supported
H4. There is a positive influence between supplier selection and logistics performance	,415	0.001	Supported

H5. There is a positive influence on information sharing and logistics performance	,028	0.262	Not Supported

Source: AMOS Ver. 24

Based on table 6 the results of the hypothesis test can be concluded as follows;
In hypothesis 1, it is known that the size of the estimate of supplier selection with logistics collaboration is 0.897, meaning that the higher the perception of supplier selection, the higher the perception of logistics collaboration. The test results showed a p-value of 0.000 < 0.05 (alpha 5%) so it was concluded statistically at a 95 percent confidence level that there was a significant positive influence between supplier selection and logistics collaboration, this is in accordance with the hypothesis proposed. The P-Value <0.05 so that H1 is supported, which means that supplier selection has a positive and significant effect on logistics collaboration in the MRO industry in Indonesia.
In hypothesis 2, it is known that the estimated amount of information sharing with logistics collaboration is 0.342, meaning that the higher the perception of information sharing, the higher the perception of logistics collaboration. The test results showed a p-value of 0.000 > 0.05 (alpha 5%) so it was concluded statistically at a 95 percent confidence level that there was a positive influence between sharing information on logistics collaboration, this is in accordance with the hypothesis proposed. The P-Value <0.05 so that H2 is supported, which means that information-sharing activities have a positive and significant effect on logistics collaboration in the MRO industry in Indonesia.
In hypothesis 3, it is known that the size of the estimate of logistics collaboration has a positive effect on logistics performance is 0.175, meaning that the higher the perception of logistics collaboration, the higher the perception of logistics performance. The test results showed a p-value of 0.003 < 0.05 (alpha 5%) so it was concluded statistically at a 95 percent confidence level that there was a significant positive influence between logistics collaboration on logistics performance, this is in accordance with the hypothesis proposed. The P-Value <0.05 so that H3 is supported, which means that logistics collaboration has a positive and significant effect on logistics performance in the MRO industry in Indonesia.
In hypothesis 4, it is known that the size of the estimate of supplier selection with logistics performance is 0.415, meaning that the higher the perception of supplier selection, the higher the perception of logistics performance. The test results showed a p-value of 0.001 < 0.05 (alpha 5%) so it was concluded statistically at a 95 percent confidence level that there was a significant positive influence between supplier selection on logistics performance, this is in accordance with the hypothesis proposed. The P-Value <0.05 so that H4 is supported, which means supplier selection has a positive and significant effect on logistics performance in the MRO industry in Indonesia.
In hypothesis 5, it is known that the estimated amount of information sharing with logistics performance is 0.028, meaning that the higher the perception of information sharing, the higher the perception of logistics performance. The test results showed a p-value of >0.5 then the hypothesis was rejected.

7. Discussion

So it can be concluded that the results of the research on the influence of supplier selection and information sharing on logistics performance with logistics collaboration as a mediating variable in the MRO Industry in Indonesia are as follows:
H1: There is a positive influence between supplier selection and logistics collaboration.
It can be seen in the results, the selection of suppliers has a positive effect on logistics collaboration. With the resulting estimation value, the relationship between supplier selection strongly affects logistics collaboration. So in another sense, the selection of the right supplier for the MRO company can have a significant increase in their logistics collaboration. Supplier selection is an important activity in the early stages of logistics collaboration with companies in the MRO industry in Indonesia, in this study stated that supplier commitment is an important indicator to be able to choose suppliers that suit the company's needs to achieve a good collaboration in the future.
H2: There is a positive influence between information sharing and logistics collaboration.
Based on the results of statistical testing, information-sharing has a positive effect on logistics collaboration. With the resulting estimation value, the relationship between information-sharing activities affects logistics collaboration quite

strongly. Information-sharing activities in logistics collaboration with companies in the MRO industry in Indonesia are also important, but in this case, of course, there are limits to the information that can be shared. Based on the results of the statement indicators, sharing information through electronic media is an important thing that MRO companies need in increasing collaboration with their partners. With information-sharing activities, it is hoped that the cooperative relationship between MRO companies and their partners can make good and sustainable cooperation to be able to support the operational activities of their respective companies, especially in logistics activities.

H3: There is a positive influence between logistics collaboration and logistics performance.

Based on the resulting estimation value, the relationship between logistic collaboration affects logistics performance quite weakly. The existence of logistics collaboration in companies in the MRO industry in Indonesia affects increasing the company's logistics performance. It can be seen from this research how the company's logistics collaboration with its partners can improve the logistics performance of MRO companies in the core business.

H4: There is a positive influence between supplier selection and logistics performance.

Based on the results of statistical testing, with the resulting estimation value, the relationship between supplier selection strongly affects logistics performance. The right supplier selection can improve good logistics performance for companies in the MRO industry in Indonesia. That means this supplier selection activity affects the overall results of the company's logistics performance. It can be said that this activity has an important effect on the logical activities of companies, especially MRO companies, in which case researchers conduct research in Indonesia.

H5: There is no influence between information sharing and logistics performance.

Based on the results of the hypothesis test, states that information-sharing does not affect logistics performance in MRO companies in Indonesia.

8. Conclusion

Based on the results of research and discussion obtained from the previous chapters, it can be concluded that:

- Supplier selection activities have a positive and significant effect on logistics collaboration in the MRO industry in Indonesia.
- Information-sharing activities with company partners have a positive and significant effect on logistics collaboration in the MRO industry in Indonesia.
- Logistics collaboration has a positive and significant effect on logistics performance in the MRO industry in Indonesia.
- Supplier selection activities have a positive and significant effect on logistics performance in the MRO industry in Indonesia.
- More information-sharing activities carried out will not always have a good influence on logistics performance, such as some information that is not related to logistics activities also cannot support the increasing logistics performance in the company. However, information-sharing activities with company partners do not affect the performance of logistics in the MRO industry in Indonesia.

9. Managerial Implications

The results of this study have implications that can be considered for the management of companies in the MRO industry in Indonesia to be able to improve logistics performance. Based on this research, it is proven that the initial stages of logistics collaboration such as supplier selection and information sharing are important things that can improve logistics performance in the end. Especially in the MRO industry where the supply of spare parts and components is needed in aircraft maintenance and maintenance. However, it can also be concluded that information-sharing activities in MRO companies have proven to have no direct effect on logistics performance, which means that information-sharing activities can still be carried out but within certain limits in providing information. Only information that focuses on logistics activities is needed.

10. Final Considerations and Limitations

This research is limited to sharing information that occurs from MRO companies with their partners, not researching information-sharing activities internally in the company. There is no indirect relationship between supplier selection

and information sharing on logistics performance mediated by logistics collaboration in the MRO industry in Indonesia.

Based on the limitations above, the researcher's suggestions for further research progress are research can be carried out with the relationship of information sharing activities divided into 2 parts, namely information sharing activities internally and externally in the company.

And further research can conduct research with additional hypotheses for the indirect relationship between supplier selection and information sharing on logistics performance mediated by logistics collaboration in the MRO industry in Indonesia.

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