

Identification of Export-Import Activities for MSMEs in Yogyakarta Through the Airport Using the House of Risk

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ABSTRACT

One of the divisions contained in PT. Angkasa Pura I (Persero) Yogyakarta International Airport (YIA), namely the Airport Commercial division. The main task of this division are of preparing development and carrying out commercial activities which include data collection and production, calculation and billing for aeronautical services and non-aviation services as well as other businesses that has airport-business relations and one of its duties is to manage procedures related to export-import activities through the cargo terminal located at YIA. In this study, a survey was conducted on MSME actors in Yogyakarta and several YIA airport staff regarding the risks that might occur in developing the export-import potential of MSMEs in the Special Region of Yogyakarta through the airport. The results showed that the causes of the risks found were the lack of assistance in filling out administrative files, the lack of information related to the procedures for carrying out exports through airports and the relatively expensive cost of air transportation. Based on these results, mitigation measures were formulated to reduce these risks, among others by increasing cooperation between the SME and DIY Cooperatives Office and the Yogyakarta Industry Office, especially in conducting socialization related to procedures for implementing exports through airports.

Keywords: Export-import, Airport Commercial, House of Risk

1. INTRODUCTION

Indonesia as a developing country is experiencing development in several sectors and one of them is in the industrial sector. The industrial sector in Indonesia is used as a foundation in the development of the country's economy. With many industries developing in Indonesia, some of the products from these industries can be used as export commodities. According to data from the Ministry of Industry of the Republic of Indonesia in 2020 regarding the value of exports, there are five groups of industrial products that have the largest export value. The group is the food industry, mining industry, processing industry, agricultural industry and other industries. The two sectors that have the largest contribution are the manufacturing and food industries with a value of USD 131,087 million and USD 162,367, respectively, of the total export development in Indonesia.

As one of the efforts to improve the welfare of the country, especially the DIY economy, the DIY government is aggressively developing the export potential of DIY products to the global market. One of them is developing the potential for MSME Product Export activities through Yogyakarta International Airport (YIA), and Adi Sutjipto Yogyakarta. The DIY government cooperates with several stakeholders in DIY MSME export-import activities in increasing the export-import potential of MSMEs in DIY. One of the divisions contained in PT. Angkasa Pura I (Persero) YIA, namely the Airport Commercial division. The main task of this division are of preparing development and carrying out commercial activities which include data collection and production, calculation and billing for aeronautical services and non-aviation services as well as other businesses that has airport-business relations and one of its duties is to manage procedures related to export-import activities through the cargo terminal located at YIA.

Based on the problems faced by MSMEs and YIA above, to identify and measure the potential risks that exist in the export-import activities and determine the priorities of the risks will used House of Risk (HOR) approach. Risk is a situation that, if it occurs, has the potential to have a negative impact on the achievement of organizational goals [1]. Therefore, it is important to conduct a risk assessment to determine what risk may arise. The results of the risk assessment will help in designing risk mitigation strategies. The House of Risk method is a method used to design a framework in mapping out a proactive strategy to mitigate the risks that arise. This model is a framework developed by Laudine H. Geraldin and I. Nyoman Pujawan by developing the FMEA (Failure Mode and Effect Analysis) method [2]. HOR consists of 2 phases. In the first phase, risk agents and potential risk events are identified. In the second phase, appropriate mitigation strategies are designed [3].

2. METHODS

The data collection process was carried out by conducting brainstorming, interviews with Yogyakarta International Airport officers and distributing questionnaires to MSMEs in DIY. The purpose of the interview is to find out what risks occur in the implementation of the export - import development of DIY SMEs through the airport. Then, from the distribution of questionnaires, it was carried out to gain an understanding of export-import activities in general and through airports, and also related to export-import procedures for DIY SMEs. Meanwhile, brainstorming is carried out to provide an assessment of the severity assessment, occurrence, correlation of the causes of risk, assessment of the correlation between risk causes and proposed mitigation actions, determining effectiveness, level of difficulty; and the ratio of effectiveness to difficulty (ETDk).

In the implementation of the HOR method, it is divided into two (2) stages, namely HOR 1 and HOR 2. HOR 1 is used to determine priority risk agents for mitigation activities to be carried out. Then HOR 2 is used to prioritize which effective actions need to be taken to minimize the occurrence of risk [4].

Phase 1 HOR

In Phase 1 HOR, the risk agents and risk events that may occur will be determined. Then from the risk agents obtained, it will be prioritized which one is given the first preventive action. The steps of HOR Phase 1 are:

- (1) Identify risk events and risk agents based on interview results.
- (2) Provide an assessment of risk events and risk agents using a likelihood scale (1-5) with the provisions as in the table below.

Table 1. Likelihood

Level	Description	Remarks
1	<i>Rare</i>	Almost never happened
2	<i>Unlikely</i>	Rarely happening
3	<i>Possible</i>	Can happen once in a while
4	<i>Likely</i>	Often occur
5	<i>Almost Certain</i>	Can happen any time

- (3) Determine the correlation between risk events and risk causes using a scale of 0.1, 3 and 9. A scale of 0 means there is no correlation, a scale of 1 means low, a scale of 3 means moderate and a scale of 9 means high. The assessment of severity aims to estimate the impact of an event. An occurrence assessment aims to estimate how often these risks occur [5]. Correlation assessment was used to measure the degree of relationship between risk agents and risk events [3].
- (4) Perform the calculation of ARP (Aggregate Risk Potential) with the following equation $ARPJ = O_j \sum S_i.R_{ij}$.

- (5) Sort the ARP values from largest to smallest

Phase 2 HOR

In Phase 2 HOR, priority values will be given to several actions that take into account the effectiveness of the proposed actions in terms of perceived resources and also finances. The steps in phase 2 HOR are:

- (1) Choose the risk agent with the highest ranking based on the Pareto chart. Determination of priority risk agent categories use Pareto law, which means that 80% of company losses are caused by 20% critical risks [6].
- (2) Identify proposed actions to reduce risk agents or risk events.
- (3) Determine the correlation matrix between risk mitigation and risk agents. The correlation matrix assessment uses a scale of 0, 1, 3 and 9.
- (4) Calculate the amount of effectiveness (TEk) with the formula:

$$TEk = \sum_i ARP_j E_{jk} * k$$
- (5) Calculate and assess the degree of difficulty using a scale of 3, 4 and 5 with the following conditions:

Table 2. Difficulty Degree Scale

Score	Remarks
3	Mitigation Actions are easy to implement
4	Mitigation Actions are a bit difficult to implement
5	Mitigation Actions are difficult to implement

- (6) Calculating the effectiveness to difficulty ratio (ETDk) with the formula:

$$ETDk = TEk / Dk$$
- (7) Sorting the proposed actions from the largest to the smallest ETDk value.

3. RESULTS AND DISCUSSION

Survey

The results of the questionnaire show that many of the MSMEs actors in the Yogyakarta and surrounding areas have exported as well as domestic shipments using three routes, namely land, sea, and air. Land expeditions dominate shipping because they are considered to be easier in procedures and relatively cheaper costs compared to sea and air routes. In general, MSMEs actors in the Yogyakarta and surrounding areas understand general export-import procedures. However, only 9% of these MSME actors understand the export-import procedure through the airport.

Analysis and Measurement of Risk Event

Based on the questionnaires that have been distributed to respondents and brief interviews with officers at the YIA cargo terminal, it was found that the risks that might occur in the development of export potential through the airport to MSMEs in the Special Region of Yogyakarta. The risk and each severity value can be seen in the Table 3.

Table 3. Risk Event Measurement Results

Code	Risk Event	Severity
E1	The reduced interest of Yogyakarta Special Region players in import-export activities through the airport	3
E2	Errors in Export - Import procedures through the airport	4
E3	Incomplete Administration File	4
E4	Difficulty using a foreign language	3
E5	Switch to using other transportation services such as sea and air	5
E6	Unable to meet international market demand	3
E7	There is an item limit on airlines	4

Code	Risk Event	Severity
E8	Delays in delivery	4

Analysis and Measurement of Risk Agent

After the risk event is determined, the next step is to determine the risk agent that causes the risk event to occur. The scale used is the same as that specified in the table below. Risk Agent will be given an occurrence value (level of occurrence) as shown in the Table 4.

Table 4. Risk Agent Measurement Results

Code	Risk Agent	Occurance
A1	Lack of socialization from the airport and several related parties	3
A2	Lack of information regarding the procedures for implementing Export - Import through the Airport	4
A3	Lack of assistance in filling out administrative files	4
A4	No foreign language training for MSME entrepreneurs	3
A5	Air freight costs are expensive compared to other transportation services	5
A6	The level of production of goods is still small	3
A7	Maximum limit of goods limit	4
A8	Planes are often delayed	4

Calculation of ARP (Aggregate Risk Potential)

After the severity and occurrence values are given, the next step is to create a correlation matrix between Risk and Risk Agent to calculate the ARP (Aggregate Risk Potential) value. If the respondent fills in the scale of 0 means there is no correlation, scale 1 means the correlation is low, scale 3 means the correlation is moderate, and scale 9 means the correlation is high as shown in the Table 5.

Table 5. Calculation of ARP

Risk (Ei)	Risk Causes (Ai)								Severity (si)
	A1	A2	A3	A4	A5	A6	A7	A8	
E1	9	3	1	1	3				3
E2	9	9	3						4
E3	9	9	9						4
E4	1	1	3	9					3
E5	3	1	9		9		3	3	5
E6				3	3	9	3	3	3
E7							9		4
E8		3		1		3	9	9	4
Occurance	3	4	4	5	5	3	4	4	
Severity xkorelasi	117	101	105	43	63	39	96	60	
ARPj	351	404	420	215	315	117	384	240	
Ranking (Pj)	4	2	1	7	5	8	3	6	

Regarding priorities for mitigation or providing appropriate solutions in handling priority risks, it can be seen in Figure 1.

Figure 1. Pareto Diagram

Determination of priority risk agents is carried out using Pareto diagram analysis which has the 80:20 principle. Where by analysis using the Pareto diagram, 80% of the lack of interest in MSMEs is caused by 20% of crucial risks. It is hoped that by focusing on 20% of the risk, the impact of 80% of the risk can be overcome.

Mapping House of Risk Phase 2

From the results of the aggregate risk potential assessment, 5 risk causes with the highest value need to be addressed immediately by providing 7 proposed mitigation actions. The mitigation actions can be seen in the table below.

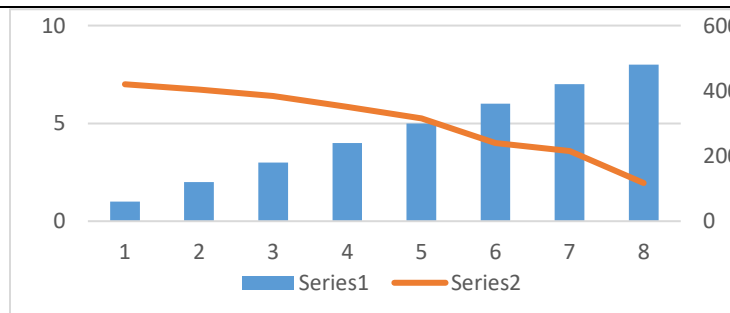
Table 6. Mitigation Action

No	Mitigation Action	Mitigation Code (PA)
1	Conduct periodic socialization to MSMEs in the Special Region of Yogyakarta	PA1
2	Collaborate with related agencies such as the DIY Cooperatives & UKM Office, as well as the DIY industry office	PA2
3	Provide information related to export - import procedures both in general and through the airport through the official website or standing banner	PA3
4	Assist in filling out administrative files	PA4
5	Cooperate with collectors or wholesalers to minimize costs	PA5
6	Cooperate with collectors or wholesalers to fulfill needs	PA6
7	Looking for airlines that don't limit goods limits	PA7

From the determination of mitigation actions in the table above, a mapping of these mitigation actions will then be carried out to see whether the proposed mitigation actions can have an effect on risk agents. After that, the degree of difficulty (Dk) of the implementation of the mitigation action will be measured. This measurement aims to determine the difficulty level of implementing the suggested mitigation actions. After that, the total effectiveness will be measured by multiplying the risk agent correlation value (j) with preventive action (k). The calculation of total effectiveness (TEk) is useful for assessing the effectiveness of mitigation actions. After TEk is calculated, the next step is to measure the effectiveness of the degree of difficulty (ETDk) or the effectiveness to difficulty ratio. This calculation is to determine the priority ranking of all proposed actions.

Table 7. Mapping House of Risk Phase 2

	PA1	PA2	PA3	PA4	PA5	PA6	PA7	ARP
A3	3	1		9				420
A2	9	9	9					404
A7					1	3	9	384



A1	9	9					351
A5		3		9	9		315
Tek	8055	8160	3636	3780	3219	3987	3456
Dk	3	3	3	3	4	4	5
ETD	2685	2720	1212	1260	804,75	996,75	691,2
Ranking	2	1	4	3	6	5	7

The results of the mapping based on the above calculations can be seen in Table 8.

Table 8. Ranking of Mitigation Action Priorities

Mitigation Action	ETDk	Ranking
Collaborate with related agencies such as the DIY Cooperatives & UKM Office, as well as the DIY industry office	2720	1
Conduct periodic socialization to SMEs in the Special Region of Yogyakarta	2685	2
Assist in filling out administrative files	1260	3
Provide information related to export - import procedures both in general and through the airport through the official website or standing banner	1212	4
Cooperate with collectors or wholesalers to fulfill needs	996,75	5
Cooperate with collectors or wholesalers to minimize costs	804,75	6
Looking for airlines that don't limit goods limits	691,2	7

4. CONCLUSION

From the results of the Phase 1 HOR mapping, it was found that 5 risk agents with the highest ARP values will be taken into consideration in the preparation of mitigation actions, namely A1 (Lack of socialization from the airport) with an ARP value of 351, A2 (Lack of information related to export-import procedures through airports) with an ARP of 404, A3 (Lack of Assistance in filling out administrative files) with an ARP value of 420, A5 (expensive Air Freight fees compared to other services) with an ARP value of 315 and the last is A7 (maximum limit of goods limit) with an ARP value of 384. Then Based on the Phase 2 HOR mapping, several actions that can be taken by the airport in increasing the interest of MSME entrepreneurs in carrying out export-import activities through the airport are as follows: PA2 (Cooperating with related agencies such as the DIY Cooperatives & SMEs Service and DIY Industry Office) with ETDk score of 2720, PA1 (Conducting periodic socialization to MSME entrepreneurs) with an ETDk score of 2685, PA4 (Performing assistance in filling out administrative files) with a score of RTDk 1260, PA3 (Providing information related to export - import procedures both in general and through the airport through the official website or standing banner) with a score of 1212, PA6 (Cooperating with collectors or wholesalers for fulfillment) with a score of 996.75, PA5 (Working with collectors or wholesalers to minimize costs) with a score of 804, 75 and the last one is PA7 (Looking for airlines that do not limit goods limits) with an ETDk score of 691.2.

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REFERENCES

- [1] S. Nasution, Y. Arkeman, K. Soewardi, and T. Djatna, "Identifikasi dan evaluasi risiko menggunakan Fuzzy FMEA pada rantai pasok agroindustri udang," *J. Ind. Res. (Jurnal Ris. Ind.*, vol. 8, no. 2, 2014.
- [2] I. N. Pujawan and L. H. Geraldin, "House of risk: a model for proactive supply chain risk management," *Bus. Process Manag. J.*, 2009.
- [3] N. E. Wahyudin and I. Santoso, "Modelling of risk management for product development of yogurt drink using house of risk (HOR) method," *Asian J. Technol. Manag.*, vol. 9, no. 2, p. 98, 2016.
- [4] B. R. Kristanto and N. L. P. Hariastuti, "Aplikasi model house of risk (HOR) untuk mitigasi risiko pada supply chain bahan baku kulit," *J. Ilm. Tek. Ind.*, vol. 13, no. 2, pp. 149–157, 2014.
- [5] T. S. Parsana and M. T. Patel, "A case study: A process FMEA tool to enhance quality and efficiency of manufacturing industry," *Bonfring Int. J. Ind. Eng. Manag. Sci.*, vol. 4, no. 3, pp. 145–152, 2014.
- [6] A. Lutfi and H. Irawan, "Analisis risiko rantai pasok dengan model house of risk (HOR)(Studi kasus pada PT. XXX)," *J. Manaj. Indones.*, vol. 12, no. 1, pp. 1–11, 2012.