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Business risk mapping for application of sharing logistic in small medium enterprises

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Abstract

The aim of the study is to investigate business risk mapping for the application of sharing logistic in small-medium enterprises. This research uses the Analytical Hierarchy Process method for risk measurement by interviewing experts. As a result, we identified 27 risks involved in the logistic sharing model. In conclusion, we found that Consumer risk was considered as the most important risk that should be anticipated in sharing logistic model; followed by Provider risk, Consumer-Provider-Transporter risk, Transporter-External Risk, Consumer-Provider Risk, Consumer-Transporter Risk, Transporter Risk, External Risk, and Provider-Transporter Risk.

Keywords: Risk; Sharing Logistic; Indonesia; Business.

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Mapeo de riesgos de negocios para la aplicación de compartir logística en pequeñas y medianas empresas

Resumen

El objetivo del estudio es investigar el mapeo de riesgo empresarial para la aplicación de la logística de intercambio en pequeñas y medianas empresas. Esta investigación utiliza el método del Proceso de Jerarquía Analítica para medir el riesgo entrevistando a expertos. Como resultado, identificamos 27 riesgos involucrados en el modelo de intercambio logístico. En conclusión, encontramos que el riesgo del consumidor se consideraba como el riesgo más importante que debería anticiparse al compartir el modelo logístico; seguido por Riesgo de proveedor, Riesgo de consumidor-proveedor-transportador, Riesgo de transportador externo, Riesgo de consumidor-proveedor, Riesgo de consumidor-transportador, Riesgo de transportador, Riesgo externo y Riesgo proveedor-transportador.

Palabras clave: Riesgo; Compartiendo Logística; Indonesia; Negocio.

1. INTRODUCTION

Logistics plays an important role in maintaining the satisfaction of the parties involved in a supply chain, including a supply chain that involves SMEs. However, the bargaining power of SMEs in using logistics services is usually smaller compared to large industrial companies whom able to perform mass production capacity, to deliver large-scale goods delivery, and to create a warehousing system that helps transport goods (HOLTER, GRANT, RITCHIE & SHAW, 2008). This causes SMEs to have a relatively weak position to obtain the best service from logistics

providers. SMEs are often difficult to get the best prices that can be provided by logistic companies.

Hence, the cost of logistics distribution can be much greater when compared with large industrial companies. Sharing logistic is one concept to facilitate while reducing costs in logistics distribution. Through sharing logistic, collaboration among SMEs can occur to create a competitive advantage in the transportation of goods, by optimizing the volume of goods transport vehicles when forwarding (delivery of goods from producer to consumer in the supply chain) and reverse logistics (delivery of goods from consumer to producer in the supply chain). This sharing logistic helps SMEs in distributing logistics to consumers or suppliers and competing with large companies (HANIMOGLU, 2018: MACHADO, SOUZA & CATAPAN, 2019).

In order for sharing logistic to be able to run well, the research must relate to the risks that can be found in the sustainability of SME business, so as to be able to mitigate the risks that could harm the parties involved in the application of the concept of logistics sharing in the SME sector. This research aims to answer several research questions and objectives. First, this study aims to identify the possible risk that will be occurred in sharing logistic implementation in SMEs. Many previous studies already explained the risk of the supply chain, logistic, and sharing economy separately. Meanwhile, the study about the risk of the

combination from logistic and economy sharing (in terms of sharing logistic) is difficult to be found. Second, we measure the importance of the weight of the risks. We employ the Analytical Hierarchy Process (AHP) in conducting the measurement by asking experts' judgments (MOGHADAMI, MOHEBBI, KHALAFI, AKBARI, FARIDNIA & TABARI, 2018).

2. LITERATURE REVIEW

2.1. Mapping and mitigating risk in a business process innovation

Once the risk is identified, then the next step is risk mapping. In a broad sense, risk mapping is in principle a risk-making based on certain groups so management can identify the character of each risk and establish appropriate action against each risk. To illustrate the character of each risk there are two dimensions used in risk mapping namely the probability of occurrence of risk and impact if the risk occurs (DJOHANPUTRO, 2008).

The next step after risk mapping is the quantification of each risk. One common method to quantifying the risk measure is by converting the probability and impact values of each risk to a scale from 1 to 10. The lower the probability of the risk event, the lower the scale. The closer to the certainty that a risk will occur, the risks

involved get the 10th scale, likewise with the impact. The analysis will be done by setting the scale from 1 to 10. The smaller the impact that covered when a risk occurs, the impact scale is closer to 1, otherwise the higher the impact, the risk getting a scale close to 10. With the use of the scale, the difficulty of the size difference can be avoided.

2.2. Methodology in Risk Mapping

One of the methods used in mapping is AHP (Analytic Hierarchy Process). GAUDENZI & BORGHESI (2006) had been used AHP to find the most critical supply chain risks by combining it with cause-effect relationships. Meanwhile, HUI, LEUNG, FU & CHEUNG (2003) had been used AHP along with Analytical Network Process (ANP) in their study to identify and organize the major attributes of benefits, costs, and risks from implementation of 4th party e-commerce logistics to the government, investor, and user. To make a comparison in AHP, we need a numerical scale that shows several times the more important or dominant elements are above other elements with other criteria being compared (SAATY, 2008).

2.3. Risk in Sharing Logistic

Several possible risks and its allocation to transporters, providers, customers, and external can be seen in Figure 1. There are several risks that allocated to transporter such as lack of employee capability including employee fraud (TUNCEL & ALPAN, 2010); lack of transportation maintenance including risk of vehicle breakdowns (TUNCEL & ALPAN, 2010; TUMMALA & SCHOENHERR, 2010); training; and mismatch capacity (TANG & MUSA, 2011; TUMMALA & SCHOENHERR, 2010). There are several risks that allocated to a provider such as management fraud; supply product monitoring/quality; and supply chain partner (payment) (TANG & MUSA, 2011). There is a risk of financial handling (risk of fail to pay/fulfill the payment) (TANG & MUSA, 2011) that is allocated to the customer. Risk of a natural disaster (TUNCEL & ALPAN, 2010; TUMMALA & SCHOENHERR, 2010) and traffic (TUNCEL & ALPAN, 2010) is associated and allocated to the external part of sharing logistic such as government.

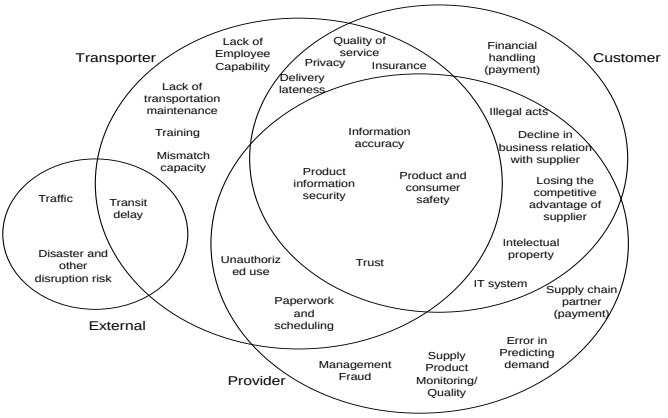

Figure 1: Possible Risk in Sharing Logistic

Some possible risks of sharing logistic also might be allocated or shared into two or more participating parts in sharing logistic. There are risks that will be shared into transporter and customer such as privacy including photo, personal/company information, tracking user location; insurance (FEENEY, 2015); quality (of service) (MANUJ & MENTZER, 2008); and delivery lateness (TUNCEL & ALPAN, 2010; TUMMALA & SCHOENHERR, 2010). Other risks can be shared among transporter, customer, and provider such as product and consumer safety (FEENEY, 2015; MANUJ & MENTZER, 2008); product information security (TANG & MUSA, 2011); information accuracy (TANG & MUSA, 2011); and trust.

There are also risks that will be shared between customer and provider such as a decline in business relations with the supplier; losing the competitive advantage of the supplier (TUNCEL & ALPAN, 2010); illegal acts; intellectual property (TUMMALA & SCHOENHERR, 2010); and IT system. Meanwhile, risk of unauthorized use and scheduling (TUMMALA & SCHOENHERR, 2010) will be shared to transporter and provider. Risk of transit delay (MANUJ & MENTZER, 2008; TUMMALA & SCHOENHERR, 2010) will be shared with transporter and external.

3. DATA AND METHODOLOGY

3.1. Methodology

This research uses the Analytical Hierarchy Process (AHP) to develop an importance level of risk in accordance to fulfill the information about the possibility of occurrence and impact from the risk that should be identified in the previous step. In risk identification, observation and literature review will be used in this research. The overall step of the methodology used in this research can be seen in Figure 2. The importance level from AHP will give priority among risk that possible to happen in the implementation of sharing logistic. In terms of sharing logistic can avoid several risks, it will be evaluated if the risk that can be reduced by using sharing logistic will not give bad impact to more important risk. Sharing logistics will be less applicable if the more important risk will increase when the solved risk from sharing logistic was decreased.

This research limitation, it will be only used the limited knowledge of researcher using their experience from observing the business model of car sharing, logistic companies, and SMEs to determine the priority in AHP. There is such probability that the priority is not quite fit in the risk identified from the literature review and through field observation. Further research, the respondent who is appropriate to contribute to the data collection

using AHP should be from academician, logistic provider, or SMEs' owner.

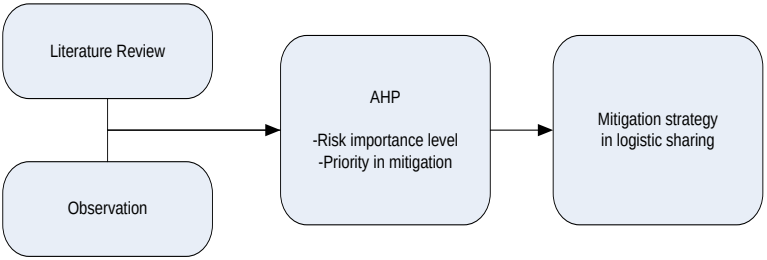

Figure 2: Research Methodology

3.2. Data, Factors, and Sub Factors in Risk of Sharing Logistic

Differences with common way analytical hierarchy process (AHP) implementation in risk mapping that identified the risk based on likelihood and impact, only the importance of risks would be addressed in the questionnaires of AHP. There will be difficulties to find the historical data that explain the occurrences and the influences of the impact. In the end, the importance of the risk will be clearer to the expert to fulfill the question in the questionnaires.

There will be two levels of AHP developed by several factors as the main level and several sub-factors as the child of the main level in the value tree. There are factors of the risk in sharing

logistic had been identified in this research and explained by Table 1. Furthermore, the sub-factor included in several factors (the only risk of financial handling and risk of transit delay or risk shared between transporter and external have no sub factor in the hierarchy) also had been identified and explained in Table 2.

Table 1. Factors in Risk of Sharing Logistic

Factors Name	Explanation	Factors Coding
Risk of financial handling (payments)	Risk that distributed to customer because customer fail to fulfil their obligation especially in the payment process.	Cons_Risk
Risk shared between customer and service provider	Risk that occurred because the relationship between customer and sharing logistic provider	Cons_Prov_Risk
Risk of service provider	Risk that occurred because incapability of the internal business process in sharing logistic provider company	Prov_Risk
Risk shared between service provider and transporter	Risk that occurred because the relationship between sharing logistic provider and driver (including the transportation mode such as truck)	Prov_Trans_Risk
Risk shared between	Risk that occurred because the relationship	Cons_Prov_Trans_Risk

customer, service provider, and transporter	between sharing logistic provider, customer, and driver (including the transportation mode such as truck)	
Risk shared between customer and transporter	Risk that occurred because the relationship between customer and driver (including the transportation mode such as truck)	Cons_Trans_Risk
Risk of transporter	Risk that happened related to driver and transportation mode during the transportation process of delivering product	Trans_Risk
Risk shared between transporter and external (Risk of Transit Delay)	Risk that occurred because the relationship between driver (including transportation mode such as truck) and parts of sharing logistic excluding customer and sharing logistic provider (e.g. environment, government). This risk represented only by risk of transit delay	Trans_Ext_Risk
Risk of external	Risk that happened and it unable to be controlled neither by customer, provider, and driver. It became parts of sharing logistic excluding customer and sharing logistic provider.	Ext_Risk

Table 2: Sub Factors in Risk of Sharing Logistic

Factors Coding	Sub Factors Name	Sub Factors Coding
Cons_Risk	-	-
Cons_Prov_Risk	risk of illegal acts	Legal_Risk
	risk of decline in business relations with supplier	Relation_Risk
	risk on losing of the competitive advantage of supplier	Competitiveness_Risk
	risk of intellectual property	IPR_Risk
	risk of it system	IT_Risk
Prov_Risk	risk of supply chain partner (payment)	Payment_Risk
	risk of error in predicting demand	Demand_Risk
	risk of supply product quality monitoring	Quality_Risk
	risk of management fraud	Fraud_Risk
Prov_Trans_Risk	risk of unauthorized used	Responsible_Risk
	risk of paperwork and scheduling	Document_Risk

Cons_Prov_Trans_Risk	risk of information accuracy	Info_Accuracy_Risk
	risk of product information security	Info_Security_Risk
	risk of product and customer safety	Safety_Risk
	risk of trust	Trust_Risk
Cons_Trans_Risk	risk of quality of service	Service_Quality_Risk
	risk of privacy	Privacy_Risk
	risk of delivery lateness	Lateness
	risk of insurance	Insurance
Trans_Risk	risk in lack of employee capability	Capability_Risk
	risk in lack of transportation maintenance	Maintenance_Risk
	risk of training	Training_Risk
	risk of mismatch capacity	Capacity_Risk
Trans_Ext_Risk (Risk of Transit Delay)	-	-
Ext_Risk	risk of traffic	Traffic_Risk
	risk of disaster and other disruption	Disaster_Risk

4. FINDINGS AND DISCUSSIONS

Based on the aggregated experts' judgment, we obtained the importance weight for each factor of risks in sharing logistic. Consumer risk was considered as the most important risk that should be anticipated in sharing the logistic model, with an average weight equal to 15.2%. Provider risk comes second with average weight equal to 14.4%. Risks faced by consumers, Providers and also transporters simultaneously take on third place with weight equal to 12.8%. Transporter-External Risk, Consumer-Provider Risk, Consumer-Transporter Risk, Transporter Risk, External Risk, and Provider-Transporter Risk come afterwards with weight equal to 11.6%, 10.7%, 10.3%, 8.5%, and 8.3% respectively.

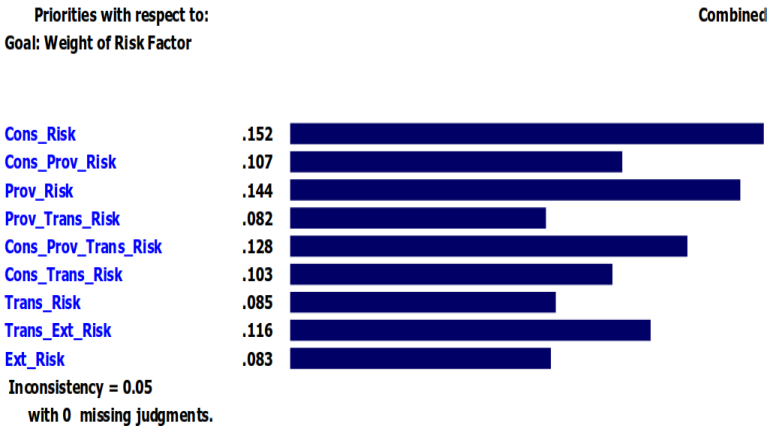

Figure 3: Weight of Logistic Sharing Risk Factors

In more detail, financial handling/payment risk –that represented by consumer risk – and transit delay risk – that represented by transporter-external risk – have become the most anticipated risks with weight equal to 15.2% and 11.6% respectively. The detailed weight of the sub-factors could be seen in figure 4 below. The combined inconsistency level for judgment of the experts is equal 0.05, which shows consistencies among the judge, thus the overall judgments were acceptable.

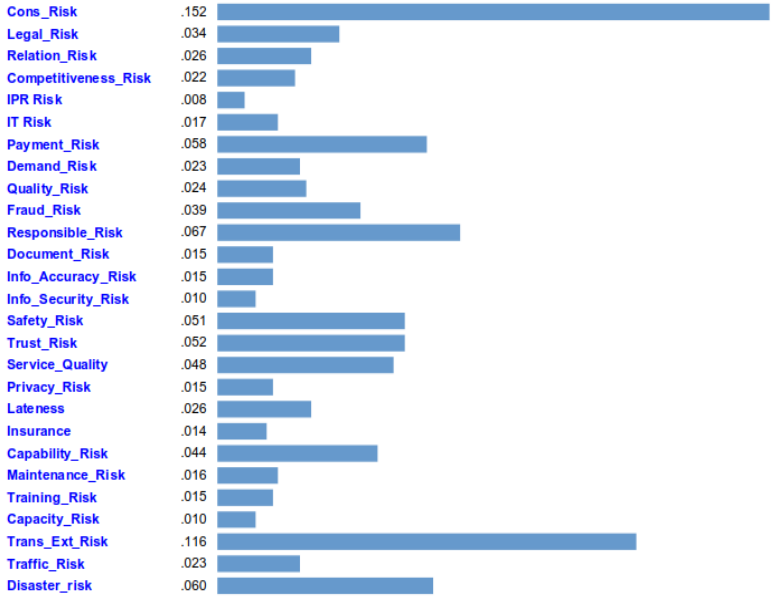

Figure 4: Weight of Logistic Sharing Risk Sub-Factors

5. CONCLUSION

This research aims to identify a possible risk that will be occurred in sharing logistic implementation in SMEs as well as their importance. Many previous studies already explained the risk of the supply chain, logistic, and sharing economy separately. Meanwhile, the study about the risk of the combination from logistic and economy sharing (in terms of sharing logistic) is difficult to be found. We identified 27 risks involved in the logistic sharing model, which are grouped into 9 factors based on the interaction of the actors in the sector. We use the AHP method to determine the weight of importance of respective factors and sub-factor risks. Further, we found that Consumer risk was considered as the most important risk that should be anticipated in sharing logistic models; followed by Provider risk, Consumer-Provider-Transporter risk, Transporter-External Risk, Consumer-Provider Risk, Consumer-Transporter Risk, Transporter Risk, External Risk, and Provider-Transporter Risk.

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