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Supply Chain Risk Management: Sustainable Waste Management Strategy, Empirical Study at KUPAS Panggungharjo Village

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Ziyadatul Rachmah[1]; Aris Kusumo Diantoro[2]

Abstract

KUPAS Panggungharjo Village is a business unit that manages waste so that it can be reused. Based on the results of field studies, there are several risks that hinder the flow of Supply Chain in KUPAS and also previously in KUPAS itself, risko studies have never been carried out. Therefore, it is necessary to map Supply Chain performance activities and identify risks that exist in supply chain flows in KUPAS. This study aims to identify what risks exist in the Supply Chain flow in KUPAS by using the Supply Chain Operation Refence (SCOR) method to determine the mapping of Supply Chain flows then using the House of Risk method to identify the risks that exist in the Supply Chain flow the one in KUPAS. Data collection techniques use interviews and observations. Interviews were conducted with informants who had been selected from purposive sampling techniques, namely to kupas employees and customers. Based on the results of the study, it is known that the Supply Chain performance is good, it can be seen from the total value of supply chain performance in KUPAS, which is 67.27. Meanwhile, the results of risk identification using the HOR method there are 4 sources of risk in KUPAS.

Keywords: *Supply Chain Performance, Supply Chain Risk Management, SCOR and HOR*

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1. Introduction

Panggungharjo village is one of the most densely populated villages. The population density of Panggungharjo is three times that of other villages in general, as is the waste produced, especially household waste. Household waste is a type of waste that is widely produced by our community which comes from daily activities (Hasibuan, 2016).

This waste generation cannot be handled independently by the community, one of the reasons is because of the limited space. In addition, the accumulation of waste is the result of the frequent closure of the Piyungan landfill which is a landfill in the local district. As a result, people illegally dump or burn their garbage in the open. This encourages the Panggungharjo Village Government to act to overcome the existing waste problem. The real form of the Panggungharjo Village government in overcoming this problem is by presenting a waste management service, namely the Waste Management Business Group (KUPAS). The KUPAS institute was established in March 2013, which focuses on waste management. The purpose of establishing KUPAS is to

[1] *Management, Nahdlatul Ulama Yogyakarta University; ziyadatul.mnj18@student.unu-jogja.ac.id*
[2] *Management, Nahdlatul Ulama Yogyakarta University; aris.kusumo.diantoro@unu-jogja.ac.id*

solve the waste in Panggungharjo so that it is not thrown into the Piyungan landfill. One of the strategies implemented by KUPAS is to educate the public to sort waste. KUPAS not only serves waste pick-up but also educates the public how to manage waste properly and correctly.

In addition to the limited capacity that KUPAS faces is about customer complaints against scheduling garbage pick-up in each customer's home. This is because employees who get a schedule to pick up garbage on that day do not come to pick up garbage, resulting in garbage piling up in every resident's house.

Based on research according to Ammarullah, (2017) about performance, namely measuring Supply Chain performance has an important role in knowing the condition of the company, whether it is experiencing a decline or improvement and what improvements should be made to improve their performance. Supply Chain performance measurement is a performance measurement system that aims to help monitor the running of the Supply Chain Management (SCM) application so that it runs well.

The number of problems caused by waste requires a strategy to overcome or reduce the problem. One strategy that can be done is to manage every waste management supply chain process. Managing the supply chain is not easy, because in this process there are parties involved in waste management activities in Panggungharjo village. Supply chain management has an important role in improving the quality of the company's services to customers. Supply chain management involves many parties in it, either directly or indirectly in an effort to meet consumer demand. Here the supply chain not only involves manufacturing and suppliers, but also involves many parties, such as consumers, retailers, whole sellers, and producers.

Based on research by Vilko et al, (2019) on risk management in multimodal maritime supply chains with 3 stages, namely, 1. Risk investigation (provisions), 2. Analysis of impact concentration in supply chains, 3. Visability and control analysis. Furthermore, shojaei and Haeri's research, (2019) which carried out the development of supply chain risk management for constrituction projects with 3 stages, namely, 1. Risk identification, 2. Risk assessment, 3. Risk mitigation, Supply Chain Risk Management (SCRM) is carried out for more informed decision making in order to avoid time and cost overruns on construction projects.

Based on the explanation above, research was conducted on the supply chain activities of the Waste Management Business Group (KUPAS) located in the hamlets of Sawit, Panggungharjo, Sewon, Bantul, Yogyakarta.

Research Gap in this study is to integrate the SCOR and HOR methods carried out in waste management sites. In addition, by integrating the two methods, it aims to develop theory and science, which is still rare or even nothing is found in the context of the waste problem.

In this study, performance measurements will be carried out on supply chain management and determine what risks arise in the supply chain flow in KUPAS.

2. Method

This research was conducted to determine the performance and what risks exist in KUPAS by using the supply chain operation reference (SCOR) method to determine its

performance and the house of risk (HOR) method to identify what risks exist in KUPAS. Data obtained directly from the object of research under study which is a source of

Table 1. Performance Atributes

No.	Indicators	Score	Sum
	Reliability		
1	Accuracy of garbage pick-up	4	
2	Quality of service KUPAS	4	16
3	Well-behaved garbage pick-up officers	4	
4	Waste pick-up officers have deft and meticulous performance	4	
	Responsivenes		
5	Speed of KUPAS response to customers	4	
6	KUPAS speed provides a solution	3	
7	Ease of mechanism for submitting customer complaints	3	10
	Agility		
8	Affordable levy costs	4	
9	The levy fee is commensurate with the services provided	3	
10	Levy costs and service quality compared (with other waste management sites)	4	11
		37	

Source : Data processed by the author

management and other supporting data obtained from literature, scientific journals, and sites on the internet related to research.

3. Result

3.1. Determination of *supply chain performance indicators*

Based on the results of interviews conducted by researchers to the speakers, they obtained results in the form of performance indicators based on the provisions of the SCOR method, namely *plan, make, deliver, source* and *retrun.* The following are the results of mapping performance indicators in KUPAS which can be seen in table 1.

The indicators that have been determined along with the scores from each dimension are obtained from informants conducted during interviews. In the table, it is explained that there are 3 *indicators, namely realibility, responsiveness* and *agility*.

3.2. Mapping Supply Chain Activities and Risk Identification

Based on the results of data collection through interviews, results were obtained in the form of mapping *Supply Chain* activities and *identifying risk events* and *the severity* value of each risk event that occurred in each supply chain activity in *the source* process at KUPAS. The following are the results of mapping and identifying risks that can be seen in Table 2.

Risks that has been identified in *the process of plan, source, make, deliver,* and *return* obtained from the results of interviews with informants. The filling *of the severity* value is carried out according to *the severity* scale. In this process, 14 risks of events were obtained along with *a severity* value for each risk. The next step is to identify the source

Table 2. Mapping of Supply Chain Activities and Severity Values

Process	Activity	Event Risk	Code	Severity
Plan	Accuracy of Garbage Pick-up Discipline	Scheduled pick up	E1	3
		Accuracy of pick-up schedule	E2	4
		Well-behaved officers	E3	2
		Dexterous and conscientious officers	E4	4
		Will to separate waste	E5	5
Source	Waste Source Condition	Ease of the state of the trash can in transport	E6	6
		Stacking according to the type of waste according to its type	E7	6
		Source of garbage exceeding capacity	E8	7
		Officers suffered injuries or were hit by sharp objects while picking up trash	E9	8
Make	Waste Management	KUPAS has provided complete and safe PPE in managing waste	E10	9
		KUPAS OFFICERS who are part of sorting garbage can get food poisoning	E11	8
		Officers who sort garbage can be exposed to sharp objects or injuries when sorting garbage	E12	9
Deliver	Omission of Retrieval	Negligence during garbage collection carried out by KUPAS officers	E13	8
Return	Impact of KUPAS	Negative impact on the community around KUPAS, regarding the existence of KUPAS	E14	9

Source : Data processed by the author

of *risk (risk agent*). *Risk agents are* obtained from the results of interviews and observations to informants according to each *risk event* that occurs in the field.

Based on the results of the identification carried out, 11 source of risk (*risk agent*) can be seen in Table 3. In addition, there are *results of occurrence* values for each source of risk obtained from the results of interviews. After knowing *the risk event* and *risk agent* along with *the severity* and *occurrence* values that have been determined by the

informant, the next step is to carry out the calculation process *of the House of Risk* phase 1 and determine the correlation value.

3.3. House of risk phase 1

After taking data through interviews with informants, results were obtained in the form of 14 *risk events* and *severity* values for each- risk event and there were 12 *risk agents* along with *an occurrence* value for each- each source of risk. After the data is obtained, a correlation value will be given between *the risk event* and *the risk agent* which will be assessed by *the expert*. Table 4 and Table 5 show the results of data processing which includes correlation assessment, ARP value and ARP ranking for *House of Risk* phase 1.

Based on the HOR phase 1 as shown in the Tables, it can be found the value of the dominant *risk agent* for the *plan* process using *personal / expert judgement*. The selection of priority risks at this stage is carried out using the risks with the highest ARP value. In *the plan process,* as many as 4 dominant *risk agents* were selected in KUPAS. This is obtained from the cumulative calculation of the ARP of each- risk to be seen at what point there is a decrease in the ARP result for the first time which can be seen table 4. 4. It can be seen in the table which shows that there are 4 dominant *risk agents* selected in kupas. The *occurrence*, *severity* and ARP values of each *risk agent* can be seen in Table 6.

After the list of priority risk sources from the *plan* process is known, then a priority risk mapping is carried out with *the Probability Impact Matrix* in accordance with the *occurrence* (Oj) and *severity* (Sj) values of each risk. The following are the mapping results to determine the position of priority risk sources.

Based on the position of the risk source in the risk map above, it can be known that there are 3 sources of risk located in the red area. This shows that the priority risk sources for risk codes A11, A3, and A5 are in a critical position that needs to be addressed quickly and appropriately to avoid unwanted or harmful things.

3.4. House of risk phase 2

After data processing is carried out for the House of Risk phase 1 stage, the next stage of

Table 3. Risk Sources and Occurrence Values

Code	Risk Agent	Incidence Rate
A1	Incorrect garbage pick-up scheduling	2
A2	Unfriendliness of KUPAS officers	1
A3	Difficulties in transporting garbage	3
A4	Waste sorting difficulties	3
A5	Too much garbage capacity	5
A6	Injuries when picking up garbage	1
A7	Absence of PPE provision	1
A8	Food poisoning	1
A9	Exposed to sharp objects during management	1
A10	Negligence of officers in taking	2
A11	Management has a negative impact on society	6
A12	Lack of human resources	5

Source : Data processed by the author

Table 4. House of Risk 1

	Risk Agent												
Risk Event	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	Severity
E1	9	0	3	3	9	0	0	0	0	9	9	9	3
E2	9	0	3	3	9	0	0	0	0	9	9	9	4
E3	0	9	0	0	0	0	0	0	0	0	9	0	2
E4	9	9	3	3	0	9	9	9	9	9	9	9	4
E5	3	0	9	9	3	9	3	9	9	9	9	0	5
E6	3	3	9	9	3	0	0	0	0	3	9	0	6
E7	9	0	9	3	3	9	0	9	9	9	9	3	6
E8	9	0	9	9	3	0	3	9	0	9	9	3	7
E9	0	0	3	0	9	3	3	9	3	0	0	0	8
E10	0	3	3	3	0	0	9	9	9	9	9	0	9
E11	0	3	3	3	0	0	3	9	0	9	0	0	8
E12	0	0	9	9	9	9	3	3	0	0	9	0	9
E13	9	3	9	9	9	9	3	0	9	3	9	3	8
E14	9	3	9	9	9	0	0	9	0	0	9	0	9
Occurrence	2	1	3	3	5	1	1	1	1	2	6	5	
Arp	429	171	571	399	549	312	252	531	312	483	783	270	
Ranking	6	12	2	7	3	8	11	4	9	5	1	10	

Source : Data processed by the author

Table 5. ARP Rating Values

A	A11	A3	A5	A8	A10	A1	A4	A6	A9	A12	A7	A2	Total
Arp	783	571	549	531	483	429	399	312	312	270	252	171	4491
%	17,43	12,71	12,22	11,82	10,75	9,55	8,88	6,94	6,94	6,01	5,61	3,80	100%

Source : Data processed by the author

Table 6. Priority Risk Source Values (HOR 1)

Code	Risk Agent	Oj	Sj	Arp	%
A11	Management has a negative impact on society	6	8	783	17,43
A3	Difficulties in transporting garbage	3	7	571	12,71
A5	Too much garbage capacity	5	8	549	12,22
A8	Food poisoning	1	7	531	11,82

Source : Data processed by the author

The House of Risk phase 2 is carried out. At this stage, data collection is carried out by conducting interviews with informants regarding the determination and assessment of handling or mitigation strategies from priority risk sources that have been selected. The handling or mitigation strategy for priority problem sources in the *plan process is* obtained from the results of interviews, discussions and assessments by informants. Based on the results of the interview and the assessment of the degree or level of difficulty (Dk) of each handling strategy for priority risk sources from *the plan* process, 6 strategies for handling risk sources can be obtained which can be seen in Table 8.

Table 7. Probability Impact Matrix

Occurrence Rate (Occurrence)	**Severity**				
	1	2	3	4	5
	Very Low	Low	Keep	Tall	Very High
5 Very High					
4 Tall					A11
3 Keep				A3	
2 Low				A5	
1 Very Low				A8	

Source : Data processed by the author

Table 8. Risk Handling/Mitigation Strategies

Code	**Mitigation**	**Difficulty Scale**
P1	Manage waste with an even better system so that waste does not smell	5
P2	Strengthen the rules regarding waste sorting to make it easier to transport	4
P3	Recreate the transport schedule so that garbage does not accumulate	3
P4	Increase the number of human resources	3
P5	Managing waste is more effective for waste that can cause poisoning	5
P6	Tighten the use of PPE	3

Source : Data processed by the author

Table 9. Probability Impact Matrix

Occurrence Rate (Occurrence)		Severity				
		1	2	3	4	5
		Very Low	Low	Keep	Tall	Very High
5	Very High	A8				
4	Tall	A5	A11			
3	Keep					
2	Low	A3				
1	Very Low					

Source : Data processed by the author

The following are estimates and expectations of mapping priority risks with the *Probability Impact Matrix* of each risk after planning a handling or mitigation strategy by the company. This is expected to help companies in reducing the level of risk that was originally in a critical position (red color) to light or low risk.

Risks for *the plan* process after the design of handling or mitigation priorities. In HOR phase 1, before the selected priority risk source is given a handling or mitigation strategy, risks with codes A11, A3, A5, and A8 are in the red area which indicates that all four are in a critical or high risk position. Meanwhile, in HOR phase 2, after being given a handling or mitigation strategy, the four risks moved to yellow and green areas which showed that the risk became a mild/low risk.

4. Discussion

4.1. *Supply Chain* Performance on KUPAS

SCOR is a reference model of the *supply chain* that aims to measure the performance of the *supply chain* itself. The implementation of the SCOR model at certain limits is quite flexible and can be adjusted to increase productivity in order to meet consumer needs (Darojat, 2017).
After identifying performance based on 5 main components, namely *plan, make, source, deliver* and *retrun*, 3 indicators have been found in performance activities in KUPAS.

Next, the normalization value is determined using the *snorom de boer* formula, the following is the result of the normalization calculation.

From the table above, it can be seen that the lowest normalization value is in the "Ease of customer complaint submission mechanism" which only has a score of 26.31, while the largest value is in the "accuracy of garbage pick-up" which has a score of 78.26. All scores obtained by all aspects will affect the results of the final calculation of KUPAS performance.

Table 10. The result of normalization

No.	Metrics	Best	Current	Worst	Normalization
1	Accuracy of garbage pick-up	4,3	3,8	2	78,26
2	Quality of service KUPAS	4,2	3,5	2	68,18
3	Well-behaved garbage pick-up officers	4	3,3	2	65
4	Waste pick-up officers have deft and meticulous performance	3,5	2,8	2	53,33
5	Speed of KUPAS response to customers	3,5	2,7	2	46,66
6	KUPAS speed provides a solution	3,3	2,5	2	38,46
7	Ease of mechanism for submitting customer complaints	3,9	2,5	2	26,31
8	Affordable levy costs	3,8	3	2,5	33,33
9	The levy fee is commensurate with the services provided	3,5	3	2,6	44,44
10	Levy costs and service quality compared (with other waste management sites)	3,8	2,9	2	50

Source : Data processed by the author

After mapping *the supply chain* performance activities in KUPAS and producing 3 indicators along with the scores that have been determined by the informants carried out during the interview, then weighting of the indicators and scores that have been determined in the previous table 11. is carried out. The following is the result of weighting the performance indicators which can be seen in the Table 12.

In the Table 12, the weight of the indicators in the *supply chain* activity in kupas has been determined. Furthermore, the calculation of the existing performance results in the performance activity of the KUPAS *supply chain* can be seen in the Table 13. From table 13., the final performance score in KUPAS is shown, namely 67.27 with the lowest value on the *responsiveness* indicator with a value of 18.11 and the highest in *the realibility* indicator with a score of 30.77. Based on the monitoring system, the performance indicator value of 67.27 can be said to be medium or average (*average).*

4.2. Risks that occur in *Supply Chain* Flows in KUPAS

4.2.1. *House of Risk* Phase 1

In the process on KUPAS for HOR phase 1, results were obtained in the form of 14 *risk events* along with *severity* values for each risk event, 12 risk agents along with *the*

Table 12. Result of Weighting Performance Attributes

Performance Attributes	Score	Weight
Supply chain reliability	16	0,432
Supply chain responsiveness	10	0,271
Supply chain agility	11	0,297
	37	1,000

Source : Data processed by the author

Table 13. The result of calculating the final value of performance

No.	*Performance attributees*	Normalization	Weight	Performance score
1	*Supply chain realibilty*	71,23	0,432	30,77
2	*Supply chain responsiveness*	68,12	0,271	18,39
3	*Supply chain agility*	61,00	0,297	18,11
Number of *supply chain* performance scores				**67,27**

Source : Data processed by the author

occurrence value for each source of risk, and the results of the correlation assessment between each *risk event* and each *risk agent*. This data was obtained from the results of interviews and discussions with informants. After obtaining overall data in the form of *severity*, *occurrence*, and correlation values, an ARP *(Aggregate Risk Potential)* value is calculated to determine the ranking of risk sources and a selection of priority sources of risk is carried out. Ranking is carried out from the highest to the lowest ARP value. Based on the results of data processing for the *source* process at the HOR phase 1 stage, results were obtained in the form of 4 priority *risk sources (risk agents*) with the highest ARP value, namely:

4.2.1.1. Waste management that has a negative impact on society (A11)

A11 risk agent is ranked first for priority risk sources with an ARP value of 783. This risk agent has a very large ARP value because it has a fairly high incidence rate which can cause very large losses. This happens the waste management in KUPAS is not adequate so that residents are still disturbed by the smell that spreads from the garbage

4.2.1.2. Difficulty in transporting waste (A3)

A3 risk agent ranks second for priority risk sources with an ARP value of 571. This risk agent has a large ARP value because it has a fairly high incidence rate that can cause losses. This happens if it is difficult for KUPAS officers to transport waste, many things will be disrupted as well.

4.2.1.3. Too much garbage capacity (A5)

A5 risk agent is ranked third for priority risk sources with an ARP value of 549. This risk agent has a fairly large ARP value because it has a fairly high incidence rate that can cause losses. This happens if the existing waste capacity exceeds the available capacity so that it can cause waste to be scattered and interfere with other activities.

4.2.1.4. Food poisoning (A8)

A8 risk agent is ranked fourth for priority risk sources with an ARP value of 531. This risk agent has a fairly large ARP value because it has a fairly high incidence rate that can cause losses. This happens if unwittingly there is garbage that can cause KUPAS officers to experience poisoning due to the waste they transport.

4.2.2. House of Risk phase 2

In HOR Phase 2, this is the stage where an assessment of the handling strategy is carried out for each priority risk source that has been obtained from the results of the HOR phase 1. At this stage the results are in the form of 6 handling/mitigation strategies, the value of the level of difficulty of the handling strategy. This is obtained from the results of interviews and discussions with existing informants. After obtaining the required data, the following are mitigations in HOR Phase 2:

4.2.2.1. Manage waste with an even better system so that the waste does not smell (P1)

Waste management with a better system can be done by improving the tools used in managing waste so that there is no garbage that accumulates and causes odors. Waste management is an important part of handling waste to convert waste into a more stable form and not pollute the environment and reduce the amount of waste that must be piled up in the TPA (Respati, 2016).

4.2.2.2. Make rules regarding waste sorting so as to facilitate transportation (P2)

Waste sorting is actually used to make it easier to manage, because when the waste is properly sorted it will make it easier for the further management process according to the type of waste that exists.

4.2.2.3. Re-schedule the transportation so that garbage does not accumulate (P3)

Rescheduling is needed in order to adjust when there is a lot of waste capacity so that garbage does not pile up in front of the owner's yard.

4.2.2.4. Increase the number of HR (P4)

The addition of the number of KUPAS human resources is needed to facilitate the process of managing waste in KUPAS, so that all human resources are able to provide more energy for the waste flow process. A human resources department must have the ability to develop, use, and maintain human resources so that organizational functions can run in a balanced manner (Sedarmayanti, 2018).

4.2.2.5.Manage waste more effectively for waste that can cause poisoning (P5)

Segregation of waste that has a possible risk of being poisoned by the officers is also needed to maintain the safety of the KUPAS officer

4.2.2.6.Tightening the use of PPE (P6)

Tightened use of PPE is needed so that while carrying out their duties, KUPAS is safe from all things that can harm and risk the lives of KUPAS officers.

5. Conclusion

Based on the results of research that has been carried out on KUPAS, the following conclusions are obtained:

5.1. The total value of supply chain performance in KUPAS Panggungharjo Village is 67.27. The best value is found in the reliability indicator with a score of 30.77 and the lowest value is found in the responsiveness indicator with a score of 18.11. Based on the performance indicator monitoring system, the value of 67.27 can be said to be medium or average (average).

5.2. Waste management that has a negative impact on society This risk agent ranks first for priority risk sources with an ARP value of 783. This risk agent has a very large ARP value because it has a fairly high incidence rate, which can cause very large losses. This happens that the waste management in KUPAS is inadequate so that residents are still disturbed by the smell that spreads from the garbage. So that there is a need for mitigation in the form of better waste management so as not to cause negative impacts on the surrounding community

5.3. Difficulty transporting waste

This risk agent is ranked second for priority risk sources with an ARP value of 571. This risk agent has a large ARP value because it has a fairly high incidence rate that can cause losses. This happens if it is difficult for KUPAS officers to transport waste, many things will be disrupted as well. So that the need for waste sorting is actually used to make it easier to manage.

5.4. The garbage capacity is too much

This risk agent is ranked third for priority risk sources with an ARP value of 549. This risk agent has a large ARP value because it has a fairly high incidence rate that can cause losses. This happens if the existing waste capacity exceeds the available capacity so that it can cause waste to be scattered and interfere with other activities. So that a re-scheduling is needed in order to adjust when the waste capacity is large, the addition of the number of KUPAS human resources is needed to facilitate the process of managing waste in KUPAS.

5.5. Food poisoning

This risk agent is ranked fourth for priority risk sources with an ARP value of 531. This risk agent has a fairly large ARP value because it has a fairly high incidence rate that can cause losses. This happens if unwittingly there is garbage that can cause KUPAS officers to experience poisoning due to the waste they transport. So it is necessary to segregate waste that has a possible risk of being poisoned by the officers. It is also necessary to maintain the safety of the KUPAS officers so that

they can be safe. The use of PPE is also needed to be tightened so that during carrying out the duties of the KUPAS, it is safe from all things that can harm and risk life. PAPER OFFICER

Bibliography

Affan & Riffa (2022*) Efektivitas pegaruh lima inti proses metode SCOR dalam pengukuran kinerja supply chain management* Borobudur Engineering Review Vol. 02 No. 1

Amrullah, Hasbi Amar. 2011. Pengukuran Performansi Supply Chain Dengan Menggunakan Metode SCOR (Supply Chain Operation Reference) dan AHP (Analytical Hierarchy Process) untuk meningkatkan kinerja perusahaan. Fakultas Teknologi Industri : Universitas Islam Indonesia.

Andriani, H. (2020). Metode Penelitian Kuantitatif dan Kualitatif. Yogyakarta : Pustaka Ilmu.

Anggrahini D., Karningsih, P. D., Yuniasri, R. 2018. Manajemen risiko kualitas pada rantai pasok industry pengolah hasil laut skala menengah. *Jurnal Sisfo,* Vol.07, No. 02, pp. 121-130.

Bambang, P. (2018). Pengukuran Kinerja Rantai Pasok Menggunakan Metode SCOR dan AHP Pada Unit Pengantongan Pupuk Urea PT. Dwimatama Multikarsa. Semarang

Christopher, M. (2016). Logistics and Supply Chain Management Fourth Edition. London: Prentice Hall.

Chotimah et al *Pengukuran kinerja rantai pasok menggunakan metode SCOR dan AHP pada unit pengantongan pupk urea PTDwimataman Multikarsa Semarang*

Cox power, *value and supply chain managemen*t An Internasional Journal Vol 4 No. 4

Darmawai, H. (2016). *Manajemen Risiko Edisi 2,* Jakarta: Bumi Aksara.

Darojat, & Yunitasari, EW. (2017). Pengukuran Performasi Perusahaan dengan Menggunakan Metode Supply Chain Operation Reference (SCOR). *Seminar dan Konferensi Nasional IDEC, 142-151.*

Diana, D. I., Tawaf, R., & Paturochman, M. (2016). Analisis Rantai Pasok Sosis Food Industries dari Produsen sampai Konsumen di Kota Bandung. Universitas Padjajaran.

Fahadha, R. U., Nuryati, Tutik, & Sutarto. (2019). Evaluasi Risiko Rantai Pasok pada Komoditas Bawang Merah di Lampung. Jurnal OPSI Vol 12 No.2.

Fahmi, I. (2017). Manajemen Risiko. Bandung: Alfabeta.

Hasibuan, R. (2016). Analisis Dampak Limbah/Sampah Rumah Tangga Terhadap Pencemaran Lingkungan Hidup. Jurnal Ilmiah Advokasi Vol. 4 No.1. ISSN 2337-7216.

Judiaman, P. (2019). Penerapan Metode Analytical Hierarchy Process (AHP) Pada Desain Sistem Pendukung Keputusan Pemilihan Calon Penerima Bantuan Pangan Non Tunai (BPNT) Di Kota Palangka Raya. Vol. 13 No. 2. ISSN 1907-896X.

Kamal et al (2019) *pengelolaan risiko rantai pasok sayuran organik (Studi kasus PT.X Cisarua Jawa Barat* Jurnal Tehnologi & Industri Vo.24 No. 1.

Karuntu & Leppe (2019) *Analisis manajemen rantai pasok indsutri rumahan tahu di kelurahan bahu Manado* Jurnal EMBA Vol 7 No. 1

Magdalena, R., & Vannie, V. (2019). Analisis Risiko Supply Chain dengan Model House of Risk (HOR) pada PT Tatalogam Lestari. Jurnal Teknik Industri Vol. 14.

Huda, Miftahul. 2022. "Volume Sisa Makanan di DIY Capai 96 Ton Perhari", https://jogja.tribunnews.com/2020/07/02/volume-sampah-sisa-makanan-di-diy-capai-96-ton-perhari

Mohammadi, M., Jounela, S. L. J., Harjunkoski, I. (2019). Optimal planning of municipal solid waste management systems in an integrated supply chain network. Computers & Chemical Engineering, Vol. 123, pp. 155-169.

Moleong, L. J.(2016) Metodologi Penelitian Kualitatif. Bandung : PT Remaja Rosdakarya.

Muhammad, S. (2020). Pengukuran Kinerja Rantai Pasok Dengan Menggunakan Supply Chain Operation Reference (SCOR) Berbasis Analitycal Herarchy Process (AHP) Pada PT. MSM. ISSN 2620-6269.

Paul, J. (2018). Transformasi Rantai Suplai dengan Model SCOR. Jakarta: PPM Manajemen.

Pujawan, I. N. (2017). Supply Chain Management. Surabaya: Penerbit Guna Widya.

Putri, I. N. (2020). Analisis Risiko Kegagalan Produk Mempengaruhi Kualitas Pelayanan Menggunakan House pf Risk dan Supply Chain Operations Reference. Jurnal Optimasi Teknik Industri Vol. 02 No. 01, 19-23.

Respati, R. 2016. Analisis K3 pada sistem pengangkutan sampah rumah tangga di jalan garuda kota Palangka Raya. Media Ilmiah Teknik Lingkungan, Vol. 1, No. 2, pp. 40-48.

Salazar, F., Caro, M., & Cavazos, J. (2017). Final Review of the Application of the SCOR Model: Supply Chain for Biodiesel Castor – Colombia Case. Journal of Technology Innovation in Renewable Energy, 39-47.

Sedarmayanti.(2018). Sumber Daya Manusia dan Produktivitas Kerja. Bandung: CV. MandarMaju.

Sugiyono (2017). Metode Penelitian Kuantitatif Kualitatif dan R&D. Bandung : Alfabeta.

Tjaja, A. I. S., Sekartyasto, D. R., & Imran, A. (2019). Meminimasi Risiko pada Rantai Pasok Menggunakan Kerangka Kerja Suplly Chain Risk Management di PT. Adhi Chandra Dwiutama. Jurnal Rekayasa Hijau