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THE EFFECT OF APPLICATION OF SCOR & HOR PHASE 1 & 2 METHODS IN ANALYZING RISK AND STRATEGY DESIGNING IN THE SUPPLY CHAIN PART OF PT. Unicharm Indonesia.

Muhamad Sayuti[1], Akda Z. Wathoni[2], Keni Kaniawati[3]

Abstract---*In supply chain activities there is always the potential for risk to arise, therefore risk management is very necessary for handling risks. PT. Unicharm Indonesia is a manufacturer of baby diapers, adult diapers, sanitary napkins and wet tissue no. in Indonesia it is no wonder that supply chain activities are so complex. And potentially full of risks. Therefore, it is necessary to do a risk analysis and design of mitigation actions, to mitigate risks or disturbances that have the potential to arise in the supply chain process of raw materials until the finished product is ready to sell to the market. This research was conducted using the house of risk model consisting of 2 phases and with the SCOR concept. The first phase is the identification of risks and risk agents, which then measure severity and occurance levels and calculate aggregate risk priority (ARP) values. Whereas in the second phase, it is the spread of strategies to reduce the risks that occur. After doing the research there are 29 risk events and 45 risk agents which are then made a paretto diagram to see which risks need to be done in designing strategies to mitigate the risks that occur.*

Keywords---*Risk Management, Supply Chain, SCOR, HOR, Fish Bone, Paretto*

I. Introduction

Diapers are: (Nursalam, R. S., & Utami, S. (2005)[1] "is a tool in the form of high absorbent disposable diapers made of plastic and a mixture of chemicals to accommodate metabolic remnants such as urine and feces. In the development of children, parents have an important role that helps determine how the personality of their children will be formed and bring their next life ".

Supply Chain Management or known as Supply Chain according to (Hadiguna, 2010)[2] is "physical networks and activities related to the flow of material and information within or across company boundaries. A supply chain will consist of a series of decision-making and execution processes related to the flow of material, information and money. The process of the supply chain aims to meet customer needs from production to the end consumer (Saudi, 2018). The supply chain does not only consist of producers and suppliers but has a dependency on the flow of logistics, transportation, storage or storage, retailers and end consumers themselves.

Buana Perjuangan University of Karawang, Indonesia[1,2]
Widyatama University[3]
[1]muhamad.sayuti@ubpkarawang.ac.id, [2]akda.zw@ubpkarawang.ac.id

Widyarto, A. (2012)[3] explain the supply chain management model that "the main actors who have an interest in the flow of goods can develop amodel *supply chain,* which is a plastic picture of the linkages of these actors which can be shaped like a connected link. one with another ".

PT. Unicharm Indonesia is one of the fast growing companies in the FMCG (manufacturing industry*fast-moving consumer goods)*. The company has 3 manufacturers, 2 of which are in KIIC *(Karawang International Industry City)* , Karawang, Answering and 1 in NIP *(Ngoro Industrial Park))* Ngoro Surabaya, East Java. After I conducted research and data collection during the research period, I observed that there were some things that would be a risk for thedepartment *supply chain management* at PT. Unicharm Indonesia. One of them is Supply which is not the same as Demmand, raw materials which continue to increase in price, fuels that continue to increase in price so that it affects the shipping costs and product selling prices.

Table 1. Data Supply & Demand & Service Level 2018

Month	**Sales Order (CS)**	**Delivery Order (CS)**	**Outstanding**	**Service Level**
January	**3,326,670**	**3,144,990**	**181,680**	**95%**
February	**3,201,425**	**2,867,649**	**333,776**	**90%**
March	**4,036.453**	**3,774,098**	**292,335**	**93%**
April	**4,048,772**	**3,737,293**	**3,11,429**	**92%**
May	**4,120,109**	**3,73,293**	**327,420**	**92%**
June	**2,706,414**	**2,216,597**	**489,817**	**82%**
July	**2,706,414**	**2,216,597**	**489,817**	**82%**
August	**4,070,642**	**3,912,962**	**157,680**	**96%**
September	**3,385,013**	**3,258,567**	**126,446**	**96%**
October	**3,273,476**	**3,153,909**	**119,567**	**96%**
November	**3,773,868**	**3,657,567**	**116,292**	**97%**
Desember	**4,263,879**	**3,798,867**	**465,012**	**89%**

Data Source: UCI GSS (Global Support System)

From the aboveappears that PT. Unicharm not maximize function *supply chain* should be, from the *service level* that has been targeted by the company policy that is 95% there are still many service levels that cannot be fulfilled meaning orders that cannot be sent and cannot be maximized properly, because several reasons such as the product does not exist, orders suddenly jumped, the risk of this risk that researchers try to solve.

Beyonddata supply & demand, there is a significant risk, namely the exchange rate of the rupiah against the dollar, which is increasingly weakening.

Figure 1. Rupiah exchange rate against the dollar

Meanwhile, according to James A. and Mona J. Fitzsimmons (2006)[4], explains that: the physical form of an item in a supply chain can be seen as a stage of the value added network of processing materials, each of which is defined by input supply, material transformation and *output* demand.

II. Method

According to Nyoman Pujawan (2005)[5] that "supply chain management strategies there are five strategies that companies can choose to make purchases to suppliers, Turban (2004)[6], Chopra and Meindl (2004)[7].

In *supply chain* PT Unicham Indonesia'snetwork, there are 4 main variables involved in its scope, namely *suppliers, factories, distributors / retailers, and customers.* The main raw materials for the production process are imported directly from abroad and within the country, the main raw materials and supporting raw materials that have been obtained are then processed by PT Unicharm Indonesia into various kinds of products according to customer demand. The entire production of PT. Unicharm Indonesia to shipment into and abroad for products exported abroad with the majority of destinations in Asean Countries Countries India and Australia total *average* 7% ofsales *domestic(93% Sales domestic).* The following is a general description of *supply chain* PT Unicharm Indonesia's.

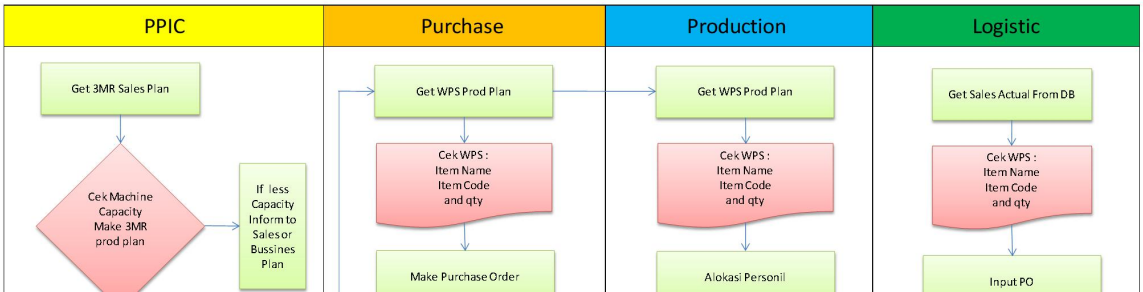

Figure 2. The flow of business processes of PT. Unicharm Indonesia

Based on the results of interviews and questionnaires that were conducted during the research phase can be mapped PT Unicharm Indonesia's supply chain activities based on the concept of SCOR with the following details:

Table 2. Mapping activities *supply chain* at PT. Unicharm Indonesia.

SCOR	**Mapping supply chain activities in the SCOR model**
Plan	1. Making production plan 2. Planning and controlling production
Source	1. Calculation of raw material requirements 2. Purchasing main and supporting raw materials 3. Receiving and Storing raw materials 4. Determination of suppliers 5. Checking raw materials that have been purchased 6. Supply of raw materials to the production line
Make	1. Conduct the production process with the following stages: a. Forming processesabsorbent pad b. Process of making a dose and polymer additing Maker c. Melt blown process (merger pulp, sap, non woven) d. Elastic spandex yarn expansion process e. cutting process f. The process of packing 2. Submit the finished goods to the warehouse
Delivery	1. Receiveorders delivery

	2. Allocation of supply of fleet products to finish good 3. fleet supply 4. Delivery to all destinations Return
Return	Return finished products from customers

Based on the results of interviews and questionnaires that have been carried out, can be seen mapping and identification of risk events (*risk events)* and the value of *risk severity and agent* and the value of *occurrence* of each risk event that occurs in the supply chain of PT. Unicarm Indonesia for all processes, namely *Plan, Source, Make, Deliver, Return.* The results of mapping and risk identification can be seen in the table below

SCOR CONCEPT	CODE ER	RISK EVENT	SVERITY
Plan	E0001	Errors in making production planning	9
	E0002	Production scheduling does not match	8
Source	E0003	Errors in calculation of purchasing raw materials for sub-materials & main materials	8
	E0004	Errors in the process of ordering raw materials	7
	E0005	Price fluctuations in SAP & PULP exchange rate effect	4
	E0006	main material price purchased is not updated	4
	E0007	Raw materials are not available, main material is used up	9
	E0008	Raw materials are left when changing new models	7
	E0009	Placement of raw materials does not match the display layout	7
	E0010	Main materials and sub raw materials material received damaged / defective	2
	E0011	Raw material specifications not in accordance with the order list	7
	E0012	Number of raw materials received not according to order	6
Make	E0013	Production target not achieved	5
	E0014	Errors in use of raw materials during the production process	9
	E0015	Stages of production process are not perfect / repair	6
	E0016	Product quality has changed unstable	7
	E0017	Number of repair products Exceeds the standard	6
	E0018	Engine stops operating	7
	E0019	Production process stops	9
Delivery	E0020	Wrong input order	8
	E0021	Item selection error when sending	7
	E0022	Calculation error jumblah fleet of transportation required	6

	E0023	Delayed delivery	5
	E0024	Products stack in warehouse	6
	E0025	Goods no time to be sent	9
	E0026	Wrong item and wrong destination	7
Return	E0027	AR DB problems (customer payment problems	8
	E0028	AR DB problems (customer payment problems	5
	E0029	Late product return	6

Severity

Assessment of severity in the production process is an assessment related to how the likelihood of the impact arising from failures or defects that occur. Severity ranking values are between 1 and 10, where scale 1 shows no impact and scale 10 shows hazard impact (Shahin, 2004)[8] Ackermann, F., Eden, C., Williams, T. and Howick, S. (2007)9

Number of Severity Rating Description Impact Rating Description		
Rating	Impact	Description
1	None	No effect
2	Very little	Very little effect on performance
3	Little	Little effect on performance
4	Very low	Very low effect on performance
5	Low	Low effect on performance
6	Medium	Moderate effect on performance
7	High	High effect on performance
8	Very high	Effect very high and can not be operated on
9	Serious	Serious effects and failures preceded by warnings
10	Dangerous	Effects and failures not preceded by warnings

Based on the results of interviews conducted during the research and data processing, found 29 risk events.

SCOR CONCEPT	CODE AR	RISK EVENT	**Occurrence**
Plan	A0001	Error in forecasting	8
	A0002	Request for sudden from customers	7
Source	A0003	Planning of raw material orders that are not appropriate	5
	A0004	Disruption of communication systems (Problem IT)	4
	A0005	Suppliers cannot fulfill raw material orders from Unicharm	8
	A0006	Error pe supplier choices	2
	A0007	Errors in the process of ordering raw materials	5

	A0008	Inventories of raw materials to be processed are running low	8
	A0009	Lack of raw material supply PULP, SAP, Non Woven from suppliers	8
	A0010	Suppliers do not fulfill contracts with Unicharm	4
	A0011	Increase in prices of main raw materials that increased	9
	A0012	Inaccurate information on prices of main raw materials	3
	A0013	Technical problems in the price negotiation process	3
Make	A0014	Uncompetent labor	3
	A0015	Lack of supervision of workers	4
	A0016	Changes in company policy	1
	A0017	Human error	4
	A0018	New employees or in the training process	3
	A0019	Relatively high production target	7
	A0020	Fire	2
	A0021	Disruption of electricity supply from PLN, sudden power outages	2
	A0022	Unavailability of good storage facilities.	2
	A0023	Production machine breakage	4
	A0024	Stacking of production processes	2
	A0025	Labor strikes	2
	A0026	Engine set-up and setting errors	5
	A0027	Less maintenance on production machines	7
	A0028	Over-hours of work	6
	A0029	Number of items returned exceeds quota	4
	A0030	Inspection process setups and 5 machine settings imperfect	5
	A0031	The production process is incompatible with the SOPs that have been set	9
	A0032	Item Code, Size, part packing, Cartons and barcodes do not match	3
Delivery	A0033	Inadequate transportation equipment	3
	A0034	Distance to remote shipping destinations	4
	A0035	Non-standard transportation equipment, such as perforated and dirty	6
	A0036	Unclear work procedures	2
	A0037	Abandonment of work procedures by employees and superiors	5
	A0038	RAW data entry error Order data	4
	A0039	Order not fulfilled	9
	A0040	Stacking of goods for too long	3
	A0041	Not implementing FIFO system	6

	A0042	Too much item entry error so the potential for incorrect batch allocation is high	4
	A0043	Delivery disrupted due to natural disaster	2
Return	A0044	Wrong item sent and wrong destination sent so that the item is returned	6
	A0045	Goods are returned from the customer because of NG	6

Occurrence

assessment of the *occurrence is* done to find out how often the possibility of a failure in the production process. Occurrence values range from 1 to 10, where a scale of 1 shows almost never happened and a scale of 10 indicates an almost certain occurrence (Shahin, 2004)[8].

Occurrence Ranking Table		
Number of Occurrence Probability of Occurrence Rating Description		
Rating	Probabilitas	Descrtiption
1	Almost never	Failure is not possible
2	Thin (very small)	Rare number of failures
3	Very few	Very few failures
4	Little	Multiple failures
5	Small	Number of very small failures
6	Medium	Number of medium failures
7	High enough	Enough high number of failures
8	High	High number of failures
9	Very high	Very high number of failures
10	Almost certain	Failures are almost certain

III. RESULT AND DISCUSSION

Results from the first research that has been done is mapping theactivities *supply chain* using the SCOR model, this mapping process is done by *brainstorming*.

Mapping *House of Risk* Phase 1(HOR)

According to Pujawan (2009)[10] if O_j is the probability of an event occurring from risk agent j, S_i is the severity of the impact of risk event i, and Rij is the correlation value between the two, then the Aggregate Risk Potential (ARP) can be calculated with the following formula:

$$\mathbf{ARPj = O_j \sum_{j} S_i R_{ij}}$$

ARP01 = 8 X ∑ 6 9 6 6 3⟧ X 9 = 1728

ARP02 = 7 X ∑ 6 6 6 2 3 9⟧ X 8 = 1456

ARP03 = 5 X ∑ 3 3 3 3 2 2⟧ X 8 = 520

ARP04 ~ and so on ARP45 = 6 X ∑ ⟦9⟧ X 7 = 378

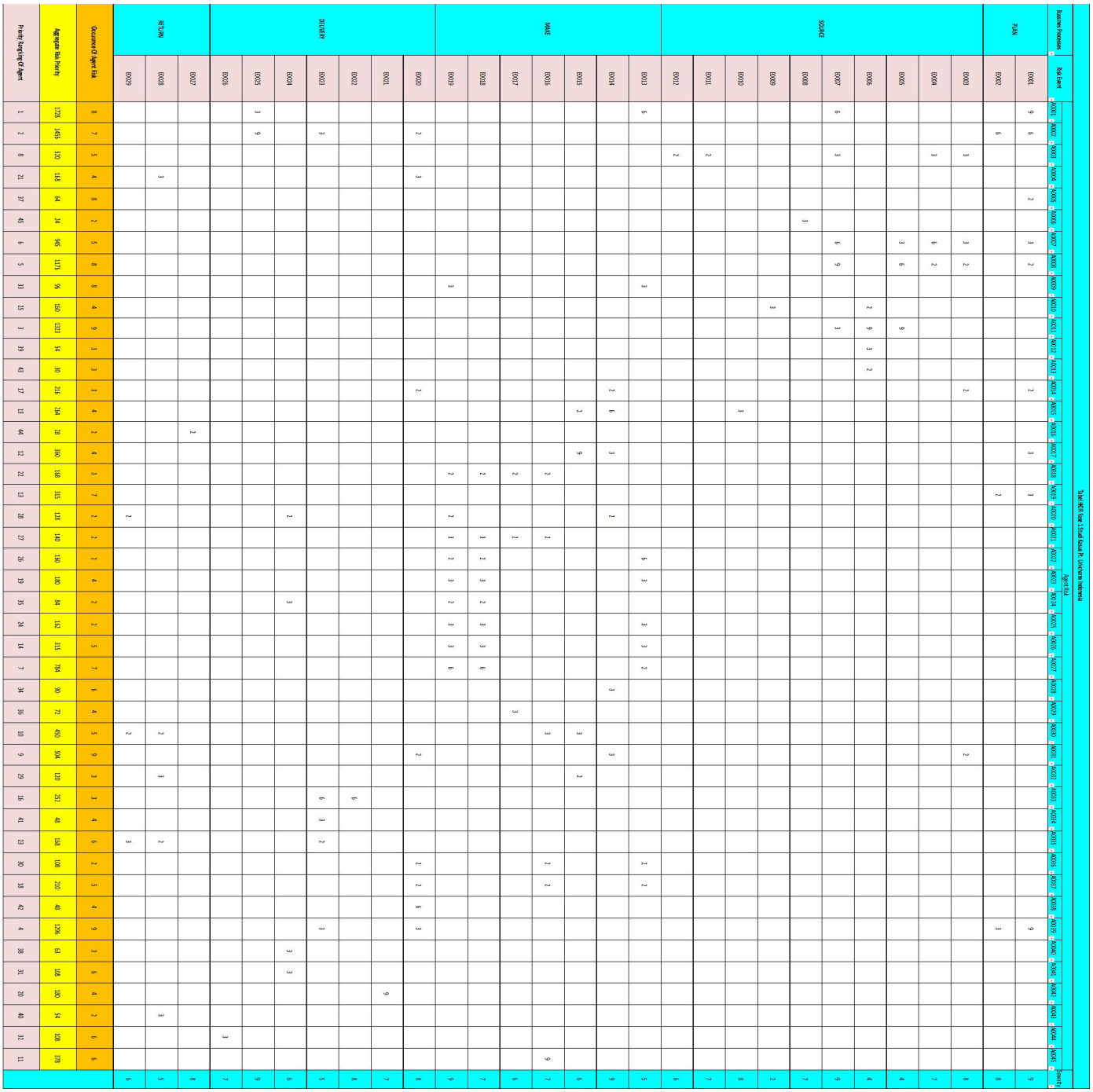

Table HOR Phase 2 Case Study Pt. Unicharm Indonesia							
treated risk agent		Preventive Action (Strategy to solve problem)					ARP
AR CODE	***Classification Agent Risk***	**PA001**	**PA002**	**PA003**	**PA004**	**PA005**	
A0001	Errors Forecasting	6	9				1,728
A0002	Sudden Request From Customer	9	3		9	6	1,456
A0011	Increase in prices of main raw material which increased	6	3		6		1,323

A0039	Orders not fulfilled			9			1,296
A0008	Inventories of raw materials to be processed are running low	3		6		6	1,176
Tek	Total effectiveness of each handling action	34,938	23,889	18,720	21,042	15,792	
Dk	The level of difficulty in implementing handling actions	3	5	4	3	4	
ETD	Effetiveness difficulty performing action	11,646	4,778	4,680	7,014	3,948	
Rank	Rank of each handling action based on the highest	1	4	3	2	5	

Calculating the Total Effectiveness (TEk) of each action with the formula:

$$TE_k = \sum_{J} ARP_j \, Ej_k$$

1. $TEk1$ = (6 X 1,728) + (9 X 1,456) + (6 X 1,323) + (0 X 1,296) + (3 X 1,176) = 34,938
2. $TEk2$ = (9 X 1,728) + (3 X 1,456) + (3 X 1,323) + (0 X 1,296) + (0 X 1,176) = 23,889
3. $TEk3$ = (0 X 1,728) + (0 X 1,456) + (0 X 1,323) + (9 X 1,296) + (6 X 1,176) = 18,720
4. $TEk4$ = (0 X 1,728) + (9 X 1,456) + (6 X 1,323) + (0 X 1,296) + (0 X 1,176) = 21,042
5. $TEk4$ = (0 X 1,728) + (6 X 1,456) + (0 X 1,323) + (0 X 1,296) + (6 X 1,176) = 15,792

Calculating the Total Effectiveness Ratio (TEk) with the level of difficulty (Difficulty) using the formula:

ETDk = TEk / Dk.

1. ETDk1 = 34,938 / 3 = 11,646
2. ETDk1 = 23,889 / 5 = 4,778
3. ETDk1 = 18,720 / 4 = 4,680
4. ETDk1 = 21,042 / 3 = 7,014
5. ETDk1 = 15,792/ 4 = 3,948

IV. Conclusion

Based on the results of data analysis using the HOR phase 1 and HOR Phase 2 methods as well as by mapping thebusiness process *supply chain management* with Kosenp SCOR found there were 29 *Risk Events* and 45 *Risk Agents* at PT. Unicharm Indonesia, after all data was collected, interviews were conducted with several members in *logistics, procuremet* and PPIC to determine the value of *Severity* andValue *Occurrence.* After getting severity value and occurrence value, we find thevalue *risk correlation* between *Agent Risk and Event Risk*. After that, look for the ARP value with the formula ARPj = Oj. ∑Rij Si where O =Value *Occurrence*, R =Value *Risk Correlation* and S =Value *Severity*.

From the many ARP values that have been calculated, a pretto diagram is made to determine which *Agent Risk* is the most dominant priority for improvement in order to reduce the potential arising from the *Agent Risk* in Pt Unicharm Indonesia, the following data are obtained:

1. Error in forecasting (A0001) with ARP value = 1,728
2. Order not fulfilled (A0039) with ARP value = 1,456
3. Sudden requests from customers with value (A0002) ARP = 1,323
4. Increase in price of main raw material which increases (A0011) with ARP value = 1,296
5. The supply of raw materials to be processed is running low (A0008) with an ARP value of 1.176.

To carry out the design of strategies or mitigate actions to reduce the risks that exist in PT. Unicharm Indonesia conducted aanalysis *fish bone* to find out the root of the problem, after that it was conducted an analysis using the HOR phase 2 method where things were done with several stages, first *preventive action* or mitigation of action then a ranking of Dk (carried out.*Degree of Difficulty)* or difficulty level was, after getting the value, connect it with the existing agent risk by determining the value of the relationship between the effective value between *Preventive Action* and *Agent Risk*, then look for the value using the formula TEk = ΣARPj Ejk. where TEk = Total effectiveness of each treatment action, ARP = *(Aggregrate Risk Priority), E =* Effective Value between *Preventive Action* and *Agent Risk*. After getting the TEK value then look for the ETD value by using the formula ETD = TEk / Dk where ETD = *Efficiveness difficulty performing actions* , TEk = Total effectiveness of each handling action, Dk = Degree of difficulty in applying the handling action. After that a rating is made for each action taken based on the order of the highest ETD value. then from the results of calculations that have been carried out in the research and management process can be concluded the right strategy to be implemented at PT. Unicharm Indonesia in 2019 is as follows:

1. Improvement of production plan adjustment based on Actual SO (PA001) with *Effetiveness difficulty performing action value* 11,646
2. Improving service level by strengthening delivery of base 2 factory (PA004) with *Effetiveness difficulty performing action value* 7.014
3. Establish good communication with customers with thread off trend forecasting (PA002) with the value of *Effetiveness difficulty performing action* 4.778
4. Implementation of the VACD Material (PA003) process with the value of *Effetiveness difficulty performing action* 4,680
5. Implementation of control material safety stock based on actual consumption (PA005) with *Effetiveness difficulty performing action* 3,948

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