Risk Management Process And Risk Scheduling Mapping With Pert/Cpm In Karsa Mandiri Utama Garment Company

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Abstract - The biggest risk faced by Karsa Mandiri Utama garment Company was the lack of scheduling arrangements, so production targets were not in accordance with the intended schedule. The purpose of this research is to analyze the risk management of inaccuracy scheduling, and the possibility of other risks that would be faced by the company. The study was conducted by applying a risk management process and scheduling of the production flow analysis using CPM/PERT. From the results of the analysis, it was found that there are two major categories of risk, one pertaining to buyers and competitors and the other pertaining to non-fulfillment of production targets. Results of repeated PERT/CPM application in the company reflected a simulation capable of optimizing the design production processes.

Keywords: Risk Scheduling CPM PERT

1.   INTRODUCTION

Karsa Mandiri Utama company runs two strategies to gain consumer demand. The first is to sell directly to the consumer (end user) to create their own brands while the second way is as an outsourcing company that receives orders. The implementation of the two strategies has an impact on the production process. For the production process of products with their own brands, the company will be easy to determine the amount of production that will be done. This is because the company will be easy to predict based on previous product sales data. The availability of data on the number of products that will be produced will allow the company to arrange the scheduling so that production targets will be achieved as planned. Unlike the case with the second way in which the company did not specify the amount of production but the decisive factor is the consumer that will provide jobs. Due to follow the wishes of consumers, the time to begin work is unpredictable.

The condition described previously gives an overview of operational risks being faced by the companies. Among risks is non-fulfillment of production targets in accordance with a predetermined schedule. Scheduling the production process still using manual systems where timing and placement is based on the experience of the head of the factory. Due to the implementation of the manual and do not use a standardized system, the percentage of errors is high which leads to delays in production. Delay will increase if more and more orders and production previously is still unresolved.

In this study the problem of scheduling will be made frame scheduling using PERT (Program Evaluation Review Technique) and CPM (Critical Path Method). This method has been applied by Jayanta [1] for approach to registration / implementations of QS-9000 in Metro City Auto Part get successful results. Mei [2] reveals that the CPM approach is a primary tool for planning, scheduling and controlling in construction industry. It consists of the logical

relationship between the activities Involved in a project. However, CPM is a deterministic approach that does not consider the uncertainties associated with all activities in a project.

Before PERT and CPM methods applied, the risk management process will be conducted to identify other risks and see the impact on the company. The results of the implementation of the risk management process is expected to complete the company will know more about what the actual risks faced by the company. If the risk management process implemented properly it will provide an increase in performance of the company. Lonsdale [3] notes, for example, that firms have made outsourcing decisions without regard to certain important risks. Knowing there is a risk that the company will be able to anticipate risks before they occur, as well as the risk of it happening. Recognition of risk management as a separate managerial function entails many advantages. Inclusion of risk management as a strategy in the general management function helps to enhance the value [4]. Professional risk management can bring these efficiencies and maximize the enterprise value [5].

2.   FRAMEWORK AND EMPIRICAL STUDIES

2.1   Risk Management Process

Risk management is a process that identifies loss exposures faced by an organization and selects the most appropriate techniques for treating such exposures Traditionally, concept of risk has been associated with uncertainty of events in future. Higher the uncertainty of events, higher is the risk. In insurance, risk is the amount of loss associated with property or life. Risk to property can be a loss or damage to car, building, house, etc. Risk to life can be described as poor health, premature death, bodily injuries as a result of accident etc. [6]. study of risk management practices indicates that risk management focuses to know shifting to a strategic one and risk involvement must be universal and thorough in the organization [7].

In managing risks requires a sequence of processes that must be done so that the plan in the face of a risk can be handled well. In general, the risk management process begins with identifying exactly what will be the risks facing the company. Once the risks are identified, the next stage determines the method for measuring the risk to get a priority of each risk. After that decide how the company will face risks that exist then the last step is the monitoring of the design of policies and programs that have been determined. Risk loop according to Olsson [8] concluded the four key elements of graphics begins with gathering information, then the process continues on determining the risks and measure them, then the risk will be assessed and forwarded to the decision whether to accept, reduce or reject the risk. Once the decision is made, the results continue to be monitored and by a process that is repeated again.

2.2   Risk Management Process

Operational risk has not been studied relative of characteristics, despite the fact that operational risk is the risk that the oldest. Said to be the oldest, because practically the manager dealing with operational issues since the company / organization started [9]. The majority of the existing literature addresses operational risk of financial institutions, with a strong focus on banks, although insurance companies have also been discussed [10].

Lambrigger et al [11] combine internal and external data with expert opinions using a Bayesian inference method to estimate parameters of frequency and the severity distribution for a loss distribution approach. Measurement of the risks of operating using two dimensions, the frequency or probability of risk and the seriousness of the Impact of the loss or the risk[9]. Based on the previous statement, to measure operational risk may have two dimensions, the frequency of occurrence of the risks and impacts that occur as a result of risk. Measurements of these two dimensions will generate better analysis compared to only measuring one dimension.

Risks that have been measured, then mapped into the matrix so that it will produce a priority for each risk. The resulting priorities will provide a reference to the decision of risk management and corporate strategy. according to Hanafi [9], a strategy that can be applied after the risks were mapped to the matrix will be divided into four sections that can be seen as follows:

• Region 1. High and High Frequency Severity: Immediate Action. For this region, the company must conduct an aggressive and immediate treatment

• Region 2. High Severity and Frequency Somewhat High: Immediate Attention. For this region, the company must immediately oversee these risks

• Region 3. Somewhat High Severity and Frequency Somewhat High: Periodic attention. For this region, the company can conduct surveillance on a regular basis

Region 4. Severity Low and Low Frequency: Annual evaluation. For this region, the company can be more loose, i.e. control, with long periods of time, such as an annual.

2.3   Risk Management Process
PERT / CPM is a scheduling method that is widely used by companies that have a complicated production process. This method will essentially map out the time and cost of each job in the production process. Planning of this method will produce an overview of some alternative scheduling as decision making [12]. This method is used to perform the assessment of duration of individual activities and calculating the earliest and the latest start and the earliest and the latest finish of activities. The earliest and the latest times that overlap are critical events, and provide a critical time. CPM, the duration of activity is assumed to be constant when the deterministic method [13].

3. METHODOLOGY AND DATA

Based on the purpose, these studies were classified into descriptive study. According to Sugiyono [14], this study explains with respect to one or more independent variables. The study will provide a description of the initial observations to get a problem solved later by using theory and method such that it will get a solution for resolving the problem.

To resolve the problem, the solution refers to Figure 1. From the Figure 1, the first stage is an initial observation to find out the problems faced by the company as well to get as much information as possible. According Sugiyono [14] data collection techniques are the most strategic step in the study, because the main goal of the study is to get the data. Techniques used in collecting data through interviews, observation and documentation. From the identification of known key problems that the company is unable to meet production targets. From these data it will be the next stage of the process of risk management to ensure that the biggest risk facing the company in accordance with the initial observation. Meanwhile, to describe and map production process will be used method PERT/ CPM which is the next stage. Of these two stages, the implementation of the risk management process and the use of methods of PERT/CPM will be concluded.
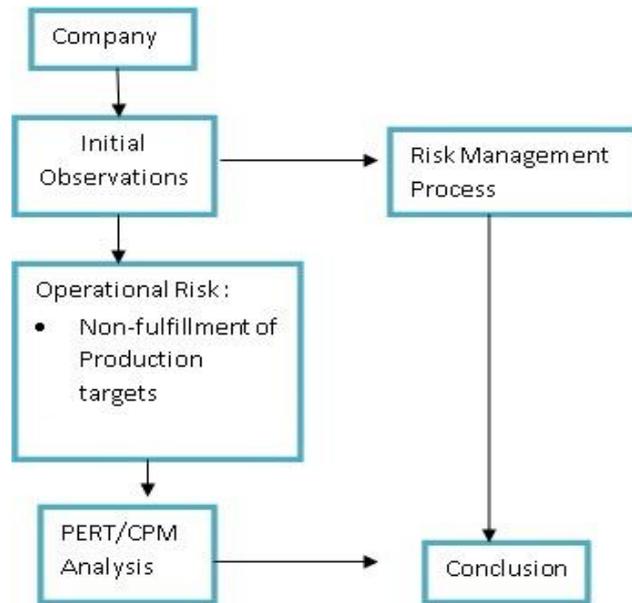
Figure1. Research Framework

4.   RESULTS AND DISCUSSION

4.1.   Risk Matrix

Based on the framework, the initial stage is to get the data. The data obtained will be processed using a method that has been determined.
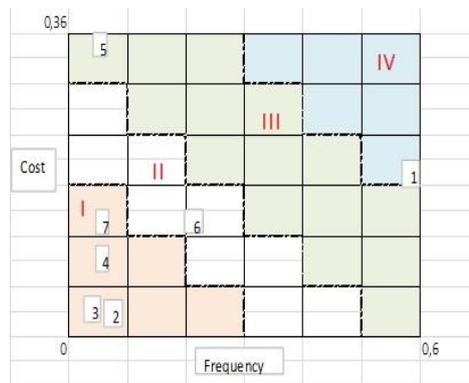

Figure 2: Risk Matrix

Table 1: Risk Identification Data

No	Risk	Annual Cost (Rp.)	Annual Frequency	Cost Probability	Frequency Probability
1	Buyer Risk	300,000,000	30	0.180	0.6
2	Supplier Risk	30,000,000	3	0.18	0.06
3	Economic Risk	60,000,000	1	0.036	0.02
4	Technology Developments Risk	180,000,000	2	0.108	0.04
5	Competitor Risk	600,000,000	2	0.359	0.04
6	Not Achieving Production Target Risk	200,000,000	10	0.120	0.2
7	Currency Risk	300,000,000	2	0.180	0.04
		1,670,000,000	50	1.000	1.000

From the data in Table 1, the probability of the cost and frequency will be measured using the risk matrix. Processing results can be seen in figure 2 below

Figure 2 shows the result of mapping the priority of each risk. Scale obtained by dividing the priority for a strategy based on each area. The division area will use the strategy proposed by Hanafi (2014). Based on matrix calculations, the strategic decisions on the existing risks are as follows:

• To risk (1) Buyer Risk, entered on one region, namely High and High Frequency Severity, then the strategy pursued is the Immediate Action, companies must conduct an aggressive and immediate treatment

• To risk (5) Competitor Risk, entered the territory of two i.e. High Severity and Frequency Somewhat High, the strategy does is Immediate Attention, companies must immediately oversee these risks

• To risk (6) Not Achieving Target Production Risk, entered the third region is somewhat High Severity and Frequency Somewhat High, then the strategy used was Periodic attention, companies can conduct surveillance on a regular basis.

• To risk (2) Supplier risk, (3) Economic risks, (4) Technology Developments Risk and (7) Currency Risk, entered the territory of 4, namely Severity Low and Low Frequency, then the strategy used is the Annual evaluations, companies will be more loose, i.e. control, with long periods of time, such as an annual.

From the results of the division of areas of risk can be sorted from the largest to the smallest. The greatest risk is the risk of the buyer, the second order is the risk of competitors, namely third order Not Achieving Target Production Risk and fourth namely supplier risk, economic risk, technology risk, exchange rate risk. Based on the above sequence, the biggest risk facing the company at the initial assumptions differ from the results of the analysis. They believed that the greatest risk is Not Achieving Target Production Risk while the results of the evaluation, the risk is there at number three, while a greater risk that the buyer's risk and risk of competitors.

4.2 Scheduling Framework PERT /CPM
The next stage is to do mapping of existing production processes in the company. Mapping will be done by using PERT / CPM. This analysis was conducted only to determine which pathways that cause delays in the production process. Data were collected with a direct view company's production process and interviews on related parts. The data have been collected and further processed results can be seen in Table 2. The first column is the code of the activities that are sorted according to the company's production process, the second column is the types of activities for each code and the last column is the data regarding previous activities which means that cannot be done the next activity if the activity in column three has not been completed.

From the data in Table 2, the company's production process in a column by color, is an activity that can be managed in regulating working time and labor. As for the column that is colorless, the setting cannot be done because the process is standard. In the color can be set for each activity is not bound in the sense that each activity can precede each one another. Based on this, it will be able to produce a variety of alternatives in designing the production process.

Table 2: Risk Identification Data

No.	Type of Activity	Previous Activity		No.	Type of Activity	Previous Activity
1	Maker (Image / Sketch Simple appropriate size to be produced, including determining the Total Size S-M-L-XL-XXL)			9.10	Sew 10	Paste Hard Cloth/ Ironing/ Obras/ Sign/ Sketch
2	Held	Maker		9.11	Sew 11	Paste Hard Cloth/ Ironing/ Obras/ Sign/ Sketch
3	Material Cutting	Held		9.12	Sew 12	Paste Hard Cloth/ Ironing/ Obras/ Sign/ Sketch
4	Sort	Material Cutting		9.13	Sew 13	Paste Hard Cloth/ Ironing/ Obras/ Sign/ Sketch
5	Put Stuff	Sort		9.14	Sew 14	Paste Hard Cloth/ Ironing/ Obras/ Sign/ Sketch
6	Quantity checks	Put Stuff		9.15	Sew 15	Paste Hard Cloth/ Ironing/ Obras/ Sign/ Sketch
7	Paste Hard Cloth	Quantity checks		10	Obras	Paste Hard Cloth/ Ironing/ Sew/ Sign/ Sketch
8	ironing	Paste Hard Cloth/ Sew/ Obras/ Sign/ sketch		11	Sign	Paste Hard Cloth/ Ironing/ Sew/ Obras/ Sketch
9.1	Sew 1	Paste Hard Cloth/ Ironing/ Obras/ Sign/ Sketch		12	Sketch	Paste Hard Cloth/ Ironing/ Sew/ Obras/ Sign
9.2	Sew 2	Paste Hard Cloth/ Ironing/ Obras/ Sign/ Sketch		13	Installation Accessories	Sketch/ Ironing/ Sew/ Obras/ Sign
9.3	Sew 3	Paste Hard Cloth/ Ironing/ Obras/ Sign/ Sketch		14	Bartek (Sew End)	Pemasangan Asesoris
9.4	Sew 4	Paste Hard Cloth/ Ironing/ Obras/ Sign/ Sketch		15	aperture	Bartek
9.5	Sew 5	Paste Hard Cloth/ Ironing/ Obras/ Sign/ Sketch		16	Replace Buttons	Lobang
9.6	Sew 6	Paste Hard Cloth/ Ironing/ Obras/ Sign/ Sketch		17	scissors Yarn	Pasang Kancing
9.7	Sew 7	Paste Hard Cloth/ Ironing/ Obras/ Sign/ Sketch		18	Stim (Iron End)	Gunting Banang
9.8	Sew 8	Paste Hard Cloth/ Ironing/ Obras/ Sign/ Sketch		19	Fold & Packing	Stim
9.9	Sew 9	Paste Hard Cloth/ Ironing/ Obras/ Sign/ Sketch				

Processing time for sewing activities had time varies depending on the degree of difficulty. Besides the wide variety of activities for a variety of sewing process. For products shirt, the type of activities there is a wide and 4-10 for existing products pants 10-25 type of activity. From the description above, the efficiency and effectiveness depend on how companies can maximize the design of the production process for activities that are colored in Table 2. In making the simulation setup of the production process is not discussed in this study. Here is a picture of PERT/CPM based on data from Table 2 that has not be set by using only 6 types of sewing.
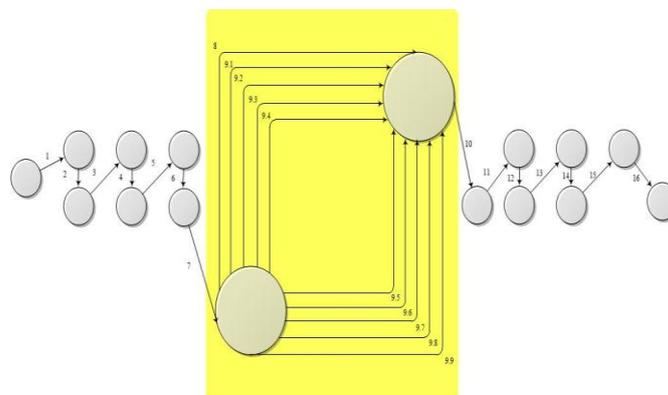

Figure3. A Company's Production Process using PERT / CPM

Figure 3 describes the production process in the company. In color-coded images show the area that can be manipulated arranged so that the company will be able to get the maximum results. In order to regulate the area then it should be done further research a more detailed

and specific so that it can be made a simulation repeatedly to get maximum production process design.

5. CONCLUSION

In the initial survey found that the biggest operational risks that exist in the company is the risk of non-fulfillment of production schedules. From the analysis results obtained, it was found there are two high risk categories. The risk is the buyer risk and risk of competitors. In the calculation of risk matrix, risk buyers enter the region I, with the implementation of the strategy (Immediate action). For competitor risk, entered the region II, with the implementation of the strategy (immediate attention). As for the risk of non-fulfillment of the company's production target for entry into the third, with the strategy of periodic attention. From the analysis of these companies should pay attention to the risks that exist in the region I, and II, because these risks have a large impact the cost and frequency of occurrence. The results of the application of PERT/CPM, companies should create a simulation that is repeated to obtain a maximum design production processes. Before the simulation is made should be detailed and specific mapping for areas with activities that can be manipulated.

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