ABSTRACT

PT. Essensilindo Perdana is one of distributor of food (cookies) product located in Jakarta. There is a conflict by the firm that often delayed its distribution product for under limit number product order by counting the distribution cost driven of each shipment. In one last year, distribution cost contributed about 45 percent of total operational cost, which reached IDR. 67.000.000,00 for each month. Another problem faced the firm is the probabilistic demand of the markets.

First of the research was aggregated market demand data into numbers of market cluster to identify the distribution function of demand. Continued by constructing the model into mathematical constitutes the assignment each warehouse i to every market cluster j in one period t policy considering the optimum distribution cost. Optimization models using genetic algorithm is chosen as tools to approach improving their distribution operational performance and remain competitive under growing competition. A mathematical model was constructed to describe the stochastic demand with many to many demand-supplier network problem. Genetic algorithm was applied to derive heuristic optimal solutions using Matlab 2006a software.

The calculation from Genetic Algorithm provides the optimal number of units shipped from each warehouse to each of 12 market clusters. Applying the GA search model, from the result we noticed that the distribution planning is $X_{11}=458$; $X_{12}=481$; $X_{13}=0$; $X_{14}=0$; $X_{15}=0$; $X_{16}=95$; $X_{17}=0$; $X_{18}=87$; $X_{19}=758$; $X_{110}=0$; $X_{111}=200$; $X_{112}=816$, also $X_{21}=565$; $X_{22}=307$; $X_{23}=142$; $X_{24}=59$; $X_{25}=97$; $X_{26}=123$; $X_{27}=76$; $X_{28}=0$; $X_{29}=761$; $X_{210}=56$; $X_{211}=0$; and $X_{212}=167$ with IDR 9.750.100,00 as total cost distribution. For this set of data, the reduction of the total cost distribution is about 32 percent. The set of data is also chosen by sequential considered of optimum cargo utilities by the minimum distribution cost affected, which given as 11% of minimum cost efficiency for 50% cargo utility. And the optimum solution chosen has 69 percent of Asemka warehouse and 72 percent of Sunter warehouse utility by all of twelve distribution cluster assignment.

Keyword : Optimization, Distribution, Genetics Algorithm