TWO-STAGE SUPPLY CHAIN OPTIMISATION MODEL
DEVELOPMENT BY CONSIDERING FIXED CHARGE

Case Study : Distribution Areas for Perum Bulog in
Surabaya, Sidoarjo, Gresik

Student Name             : Soesilowati
Student Identity Number  : 2512202001
Supervisor                       : Prof. Dr.Ir. Suparno, MSIE.
Co-Supervisor            : Erwin Widodo, ST., M.Eng., Dr.Eng.

ABSTRACT

Product distribution is a part of the supply chain process. In this research, the supply chain is categorized into two stages. These include first stage starting from supplier to distribution center (DC) and second stage from DC to customer. Perum Bulog has already calculated the total distribution cost based on the actual condition of two stage that we called as existing condition. Components of cost involved are loading and unloading cost, maintenance cost, return cost, operational cost and fixed charge or fixed cost that is charged once on delivery. Optimization process will be proposed as a better solution to minimize cost using implementation of Lingo 14 software package.

This research implemented cost reduction program (CRP) which is started with cost centers selection based on depth interview with the related areas, including administration and finance area, distribution and logistic area, and human resource area. By collecting many information from different areas, cost account and any information related to the distribution process can be selected clearly. The purpose of cost reduction program is to minimize cost by using optimization technique for reducing inappropriate costs.

Model results will clearly define the optimal distribution cost with proper product allocation from supplier to DC then to distribution point or customer that will be used for company system design support. Sixty-seven sub districts are used as distribution points located in Surabaya, Sidoarjo and Gresik with lot size delivery used for transportation vehicle selection to obtain optimal distribution cost. Comparison between existing condition and proposed condition with 2 scenarios are used to explain about the difference of calculation procedure. The result will show that the proposed condition obtained using 3 vehicle types (2nd scenario) gave a smaller cost than the existing one.

Keywords: fixed charge, optimization, product distribution, two-stage supply chain
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