Abstract

Supply chain is key to the success of a company, especially a manufacturing company, supply chain must have a total supply cost, one of which is to reduce distribution costs from the company. Finished goods distribution is a determining factor for product success, distribution is the bridge between producers and consumers, product failure in the distribution process is very detrimental to the company. Distribution costs from PT Central Pertiwi Bahari are currently included in the category of companies with typical distribution performance. The condition of the company currently has a factory located in Surabaya, East Java, however, consumers owned by the company must work in the Jabodetabek area. The company has planned various factory locations in Kendal, Central Java, so company needs a new distribution network for new factory location, with a large production capacity.

Distribution network is a group of interconnected storage facilities and transportation systems that receive product inventory and send it to customers, for the company's distribution network model will use transit warehouses. These central warehouse facilities are internal suppliers to customer-facing outlets, otherwise known as forward distribution. There are many ways to optimize the distribution network model of a company with a transit warehouse, in this final project, the author will optimize the company's distribution network model with a transit warehouse using two different methods, namely single objective linear programming (LP) from Chopra, Meindl in 2016 and mixed integer non-linear programming (MINLP) from T. Paksoy in 2010 which has 3 objective functions. LP model will be optimized using the Python programming language with the Gurobi package, and MINLP model will be optimized using an Excel with solver, due to the limitations of Gurobi which cannot optimize non-linear models.

In building the model, data needed namely consumer demand forecast, distribution costs between routes, factory and warehouse capacities, and storage and ordering costs. PT Central Pertiwi Bahari has 3 factories, which are located in Lampung, Karawang, Kendal, and 3 distribution warehouse centers, located

in ACL, Kendal, and Surabaya. This facility will fulfull consumers in Sumatera, Jabodetabek, Central Java, West Java, East Java and Bali.

After the model is built and optimized using each application, the selected network is the network from the LP method, the total distribution cost to be incurred by PT Central Pertiwi Bahari is IDR 598,461,610 per month, with 444,012.50 kg of product shipped, so that the average the average shipping cost per kg is Rp 1.347.85. By using this network, the company will have the performance of a leading enterprise distribution network according to Rob Ruffin, et. al (2018).