ABSTRACT

PT XYZ is a company engaged in the e-commerce sector for well-known FMCG (Fast Moving Consumer Goods) brands in Indonesia. One of its highest-selling products is bath soap. To meet the demands, there is one supplier and one distribution center (DC) located in Jakarta, and PT XYZ has nine retailer warehouses spread across Indonesia. During the year 2022, several retailer warehouses did not meet their respective service level targets. Therefore, it is necessary to propose planning and scheduling of distribution activities using Distribution Requirement Planning (DRP).

Distribution Requirement Planning (DRP) is a method used to manage inventory procurement in a multi-tier distribution network. This method relies on demand independence, where forecasting is done to meet the procurement structure. In this study, a mathematical model is used for Distribution Requirement Planning. The calculations are performed using a solver called Gurobi Optimizer, and the programming language used is Python. The forecasting method employed is the Winters Method due to the seasonal data pattern in demand.

By implementing DRP through the solver, the demand at each facility can be met according to the target, thus achieving the desired service level. Based on the solver's calculations, the total cost for this Distribution Requirement Planning is Rp2,378,525,480. In contrast, the actual cost for PT XYZ in 2022 is Rp4,985,337,384. After comparing the total cost of the proposed DRP with the actual cost, it is found that the proposed DRP can save a total cost of 52.29%. This cost saving is possible because the DRP is based on actual demand data and the delivery of orders in one period for subsequent periods, allowing for more optimal order planning and minimizing the number of deliveries in a year, resulting in lower order cost expenditures. For future periods, this study also forecasts demand using the Winters Method. The results of this forecast can then be calculated for planning and scheduling distribution activities using the Distribution Requirement Planning (DRP) method through the solver.

The findings of this research can be considered as a proposal for PT XYZ to enhance the planning and scheduling methods of distribution activities, improving service levels to achieve targets and increasing total distribution cost efficiency by 52.29%.

Keywords – ***Scheduling, Distribution, DRP, Service level.***