

ABSTRAK

CV Puja Box merupakan perusahaan manufaktur *carton box* yang menerapkan sistem produksi *Make to Order* (MTO). Perusahaan menggunakan bahan baku *sheet* jenis *single wall* dan *double wall* yang diperoleh dari satu *supplier*. Perusahaan mengalami permasalahan pengendalian persediaan berupa kelebihan dan kekurangan bahan baku akibat permintaan yang bersifat probabilistik dan ketidakpastian *lead time* pengiriman dari *supplier*. Kondisi tersebut menyebabkan total biaya persediaan meningkat dan berpotensi mengganggu kelancaran proses produksi. Perusahaan juga menerapkan kebijakan pemesanan rutin yang belum mempertimbangkan karakteristik *multi-item* dan integrasi *buyer-vendor*.

Penelitian ini mengembangkan model persediaan *multi-item buyer-vendor* berbasis *Joint Replenishment Order* (JRO) dengan mempertimbangkan *demand* probabilistik dan ketidakpastian *lead time* guna meminimalkan total biaya persediaan berdasarkan karakteristik sistem persediaan pada CV Puja Box. Variabel keputusan pada penelitian ini yaitu interval pemesanan optimal, tingkat persediaan maksimum, dan *safety stock*. Model dasar yang digunakan dalam pengembangan model ini adalah model Eynan & Kropp (2007) dan Ben-daya & Hariga (2004).

Berdasarkan hasil analisis model, diperoleh interval pemesanan optimal sebesar 0,9762 bulan atau sekitar 29 hari. Tingkat persediaan maksimum untuk bahan baku *sheet single wall* dan *double wall* masing-masing sebesar 6.246 lembar dan 3.161 lembar, dengan nilai *safety stock* sebesar 600 lembar dan 334 lembar. Total biaya persediaan berdasarkan model usulan diperoleh sebesar Rp154.217.249,57 per bulan, sedangkan total biaya persediaan berdasarkan kebijakan perusahaan sebesar Rp159.700.813,64 per bulan. Model usulan mampu memberikan penghematan biaya sebesar Rp4.483.564,07 atau setara dengan 2,82%. Hasil analisis sensitivitas menunjukkan bahwa parameter *demand* merupakan parameter yang paling berpengaruh terhadap total biaya persediaan, sedangkan parameter biaya simpan *buyer* dan biaya kekurangan persediaan memiliki pengaruh yang relatif lebih kecil.

Kata Kunci: *Joint Replenishment Order, buyer-vendor, multi-item, demand probabilistik, ketidakpastian lead time.*

ABSTRACT

CV Puja Box is a carton box manufacturing company that implements a Make to Order (MTO) production system. The company uses single wall and double wall sheet raw materials supplied by a single supplier. The company experiences inventory control problems in the form of excess and shortage of raw materials due to probabilistic demand and uncertainty in supplier lead time. These conditions cause the total inventory cost to increase and potentially disrupt the production process. In addition, the company still applies a routine ordering policy that has not considered the characteristics of a multi-item inventory system and buyer–vendor integration.

This research develops a multi-item buyer–vendor inventory model based on the Joint Replenishment Order (JRO) method by considering probabilistic demand and lead time uncertainty in order to minimize total inventory cost according to the inventory system characteristics at CV Puja Box. The decision variables in this research are the optimal ordering interval, maximum inventory level, and safety stock. The basic models used in this research development are the models proposed by Eynan & Kropp (2007) and Ben-daya & Hariga (2004).

Based on the model analysis results, the optimal ordering interval obtained was 0.7206 months or approximately 22 days. The maximum inventory levels for single wall and double wall sheet raw materials were 6,246 sheets and 3,161 sheets, respectively, with safety stock values of 600 sheets and 334 sheets. The proposed model resulted in a total inventory cost of Rp154,217,249.57 per month, while the company's current policy resulted in a total inventory cost of Rp159,700,813.64 per month. Therefore, the proposed model was able to provide cost savings of Rp4,83,564.07 or equivalent to 2.82%. The sensitivity analysis results showed that the demand parameter was the most influential parameter affecting total inventory cost, while buyer holding cost and shortage cost parameters had relatively smaller effects.

Keywords: *Joint Replenishment Order, buyer–vendor, multi-item, probabilistic demand, lead time uncertainty.*