

Abstrak

UD Pesona Batik Madura merupakan usaha yang memproduksi batik di wilayah Bangkalan dan menghadapi berbagai permasalahan rantai pasok seperti ketidakpastian aliran material dan informasi, tidak terintegrasinya pembelian bahan baku, tingginya biaya distribusi, serta belum adanya kontrak formal dengan mitra usaha. Penelitian ini bertujuan merancang jumlah gudang dan jalur distribusi optimal guna menekan biaya pengiriman serta menyusun dokumen kontrak kerja sama yang mengikat antara pemasok, UD PBM, dan retail. Penelitian dilakukan dengan pendekatan studi kasus, wawancara, observasi lapangan, serta pengolahan data menggunakan pendekatan *Mixed Integer Linear Programming* (MILP) dengan bantuan *software* LINGO. Hasil *running* LINGO menunjukkan bahwa solusi optimal telah ditemukan dengan nilai objektif sebesar Rp 49.000.000, nilai ini merepresentasikan biaya minimum untuk penyewaan gudang. Berdasarkan delapan opsi gudang yang tersedia, model hanya memilih gudang ke-2 (ditunjukkan oleh $W_j(2) = 1$) karena memiliki kapasitas 2.536 unit ($G_j(2) = 2536$) yang tepat untuk menampung seluruh pasokan yaitu 1.033 lembar kain mori dan 1.503 lembar batik, total 2.536 unit. Tidak ada pelanggaran kendala (*infeasibility* = 0), sehingga model valid dan efisien dalam mengalokasikan satu gudang dengan kapasitas cukup dan biaya paling ekonomis. Selain itu, rancangan *supply agreement* dan *sales representative agreement* disusun berdasarkan regulasi hukum Indonesia untuk memberikan kepastian hukum, mengurangi risiko usaha, dan memperkuat hubungan mitra. Rekomendasi perbaikan ini diharapkan dapat meningkatkan efisiensi operasional dan daya saing UD PBM di pasar batik nasional.

Kata kunci: MILP, Gudang, Jalur Distribusi, *Supply Agreement*, *Sales Representative Agreement*.

Abstract

UD Pesona Batik Madura is a business that produces batik in the Bangkalan region and faces various supply chain problems such as uncertainty in the flow of materials and information, lack of integration in the purchase of raw materials, high distribution costs, and the absence of formal contracts with business partners. This study aims to design the optimal number of warehouses and distribution routes to reduce shipping costs and to draft binding cooperation contracts between suppliers, UD PBM, and retailers. The research was conducted using a case study approach, interviews, field observations, and data processing using the Mixed Integer Linear Programming (MILP) approach with the assistance of LINGO software. The LINGO results showed that the optimal solution had been found with an objective value of Rp 49,000,000, which represents the minimum cost for warehouse rental. Based on the eight available warehouse options, the model only selected the second warehouse (indicated by $W_j(2) = 1$) because it has a capacity of 2,536 units ($G_j(2) = 2,536$), which is sufficient to accommodate the entire supply of 1,033 pieces of mori fabric and 1,503 pieces of batik fabric, totaling 2,536 units. There are no violations of constraints (infeasibility = 0), so the model is valid and efficient in allocating one warehouse with sufficient capacity and the most economical cost. Additionally, the supply agreement and sales representative agreement designs are based on Indonesian legal regulations to provide legal certainty, reduce business risks, and strengthen partner relationships. These improvement recommendations are expected to enhance operational efficiency and the competitiveness of UD PBM in the national batik market.

Keyword: MILP, Warehouse, Distribution Channel, Supply Agreement, Sales Representative Agreement.