

ABSTRACT

The objective of this research work is to offer practical guidelines to the steel wire retail supply chain managers in choosing the correct distribution center, finding out an optimal number of warehouses thus helping them in reducing overall distribution cost. Multi-objective Non-Linear Programming model is developed using diverse settings for the product-specific outbound retail supply chain network. The model is solved using meta-heuristics such as a novel hybrid Multi-objective Self-learning Particle Swarm Optimization (MOSLPSO), Non-dominated Sorting Genetic Algorithm-II (NSGA-II) and Territory Defined Evolutionary Algorithm (TDEA). The model and solution methods are tested on real datasets obtained from the organization in the steel wire retail setting under different scenarios. The actual data on inventory holding, ordering, and transportation costs of distributors and retailers are used as inputs. The framework presented endorses systems approach and suggests a near-optimal solution for calculating inventory for an individual distributor and his retailers.

First, the Long-term strategic planning decisions are addressed by determining the location of distributor warehouse considering existing network of manufacturing plants, warehouses, and retailers. The potential combination of locations suggested will not only help in reducing the distribution costs but also for serving the customer on time.

Second, the medium-term decisions are addressed for rolling horizons in term of inventory optimization decisions at individual entity level including retailers using economic order quantity model by considering the lead time and demand variations. The model developed optimizes inventory as well as distribution costs.

The short-term decisions about, which warehouse to be served which retailer is addressed based on distance traveled and time required to deliver material.

The decisions above will lead to the improvement in steel wire retail supply chain processes uncertain market environment. The model has been developed taking into account desired customer service levels to avoid loss of the customer orders.