Simulation Model for Multi-Echelon Multi-Depot Supply Chain System

R. Rajkumar, R. Harikrishnakumar, and K. Krishnan

Department of Industrial, Systems, and Manufacturing Engineering
Wichita State University
Wichita, KS, USA

Corresponding author's Email: krishna.krishnan@wichita.edu

Abstract: The manufacturing industry is eager to implement the advancements of the fourth industrial revolution (Industry 4.0) due to the magnitude of the benefits it can provide. Hence, Industry 4.0 opens a wide avenue for researchers to explore possibilities in the field of the supply chain. This project focuses on building a decision framework for a supply chain system with disruptions. The impact of strategic decisions under the condition of unprecedented events for a vehicle routing problem (VRP) using simulation models is studied here. Those results help the supply chain managers in making sound decisions regarding different scenarios of disruption in VRP. To achieve this, multiple cases under different scenarios of facility disruption are considered. For all cases, the dependent parameter, namely, retailer service level and lost revenue, form the basis of the decision framework. The concept of live data is implemented by making retailer demand, current inventory at the depot, the position of the vehicle in the network and the current number of units in transit as the input data.

Keywords: Vehicle Routing Problem (VRP), Industry 4.0, Simulation