ELECTRONIC COMPONENTS SUPPLY CHAIN MANAGEMENT USING EVOLUTIONARY ALGORITHM

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ABSTRACT

Electronic components Supply Chain management for environmental concerns a technique based on neural networks to optimize inventory in the whole electronic components supply chain. We focus on to specifically determine the dynamic nature of the excess stock level and shortage level required for inventory optimization in the Electronic components supply chain such that the total Electronic components Supply Chain management for environmental concerns cost is minimized. The complexity of the problem increases when more products and multiple agents are involved in Electronic components Supply Chain management for environmental concerns process that has been resolved in this work. One important aspect of supply chain management is the maintenance of an efficient and cost effective system for the distribution of goods or products to retailing outlets. We show in this paper how an evolutionary algorithm (EA) can play an effective role in this aspect. Besides being an effective and efficient optimization tool capable of handling problems of significant computational complexity, it enjoys great flexibility in coping with the constraints of typical real-life supply chain problems. Our work considers the problem of managing a distribution network for replenishing the supply of fuel to refueling stations located all over the island. It is designed to generate a set of routes for a fleet of fuel trucks. The trucks are dispatched according to a pre-specified plan to replenish the supply of the various refueling stations subject to several dynamic constraints. Our solution methodology is an EA capable of generating approximate solutions with reasonable computational time.

Key Words: Electronic components Supply Chain, Evolutionary Algorithm, Travelling Salesman Problem, Fuel Truck Dispatch System.

1. INTRODUCTION

Electronic components Supply chain management using environmental collaboration can be defined as "Electronic components Supply chain management using environmental collaboration can is the coordination of production, inventory, location and transportation among the participants in a Electronic components Supply chain management using environmental collaboration can to achieve the best mix of responsiveness and efficiency for the market being served." After a literature review it is realized that there are some flaws in the earlier researches. In the area of integrated inventory models, above-mentioned situations are rarely put together with Electronic components Supply chain management using environmental collaboration can. On the other hand, minimization of the cost attracts the attention of few researchers in recent years for the inventory models, but they only considered one side of the supply chain, which is either the buyer or the vendor side. As it is mentioned earlier, nowadays integration of entities is really essential in order to be successful in the competitive market in a Electronic components Supply chain management using environmental collaboration can. Unfortunately, the researchers who studied the market changes did not concern about this key issue of the supply chain management.

2. RELATED WORK

Narmadha at. al. (2010) proposed Multi-Product Inventory Optimization using Uniform Crossover Genetic Algorithm. Radhakrishnan et. al. (2009) gives a inventory optimization in Supply Chain Management using Genetic Algorithm. Singh and Kumar (2011) gives a inventory optimization in Efficient Supply Chain Management. Priya and Iyakutti (2011) proposed Web based Multi Product Inventory Optimization using Genetic Algorithm. Thakur and Desai (2013) a study inventory Analysis Using Genetic Algorithm In Supply Chain Management.

Khalifehzadeh et. al. (2015) presented a four-echelon supply chain network design with shortage: Mathematical modelling and solution methods. Kannan et. al. (2010) Discuss a genetic algorithm approach for solving a closed loop supply chain model: A case of battery recycling. Jawahar and Balaji (2009) Proposed A genetic algorithm for the twostage supply chain distribution problem associated with a fixed charge. Zhang et. al. (2013) presented A modified multi-criterion optimization genetic algorithm for order distribution in collaborative supply chain. Che and Chiang (2010) proposed A modified Pareto genetic algorithm for multi-objective build-to-order supply chain planning with product assembly. Yimer and Demirli (2010) Presented A genetic approach to two-phase optimization of dynamic supply chain scheduling. Wang, et. al. (2011) Proposed Location and allocation decisions in a two-echelon supply chain with stochastic demand – A genetic-algorithm based solution. Humphreys, et. al. (2009) presented Reducing the negative effects of sales promotions in supply chains using genetic algorithms. Sherman et. al. (2010) gives a production modelling with genetic algorithms for a stationary pre-cast supply chain. Ramkumar, et. al. (2011) proposed Erratum to "A genetic algorithm approach for solving a closed loop supply chain model: A case of battery recycling". Ye et. al. (2010) Proposed Some improvements on adaptive genetic algorithms for reliability-related applications. Guchhait et. al. (2010) presented Multi-item inventory model of breakable items with stock-dependent demand under stock and time dependent breakability rate. Changdar et. al. (2015) gives an improved genetic algorithm based approach to solve constrained knapsack problem in fuzzy environment. Sourirajan et. al. (2009) presented A genetic algorithm for a single product network design model with lead time and safety stock considerations. Jiang et. al. (2015) gives Joint optimization of preventive maintenance and inventory policies for multi-unit systems subject to deteriorating spare part inventory. Dey et. al. (2008) proposed Two storage inventory problem with dynamic demand and interval valued lead-time over finite time horizon under inflation and time-value of money. Jawahar and Balaji (2012) proposed A genetic algorithm based heuristic to the multi-period fixed charge distribution problem. Pasandideh et. al. (2010) gives a parameter-tuned genetic algorithm for multi-product economic production quantity

model with space constraint, discrete delivery orders and shortages. Yadav et. al. (2016) proposed a cooperative Two-Warehouse Inventory Model for Deteriorating Items with Variable Holding Cost, Time-Dependent Demand and Shortages. Consider a similar model, Two Warehouse Inventory Model with Ramp Type Demand and Partial Backordering for Weibull Distribution Deterioration. put forward a model, A two-storage model for deteriorating items with holding cost under inflation and Genetic Algorithms. Singh et. al. (2016) proposed a Two- Warehouse Model for Deteriorating Items with Holding Cost under Particle Swarm Optimization. Consider a similar model, A Two-Warehouse Model for Deteriorating Items with Holding Cost under Inflation and Soft Computing Techniques. Yadav et. al. (2016) analyzed a Multi Objective Optimization for Electronic Component Inventory Model & Deteriorating Items with Two-warehouse using Genetic Algorithm. Sharma et. al. (2016) focused an Optimal Ordering Policy for Non-Instantaneous Deteriorating Items with Conditionally Permissible Delay in Payment under Two Storage Management. Yadav et. al. (2016) analyzed a Analysis of Genetic Algorithm and Particle Swarm Optimization for warehouse with Supply Chain management in Inventory control.

3. EVOLUTIONARY ALGORITHM

From an optimization point of view, the FTDS can be formulated as a CVRP. To solve the CVRP, we configured an evolutionary algorithm. The basic block architecture of the evolutionary algorithm is given below.

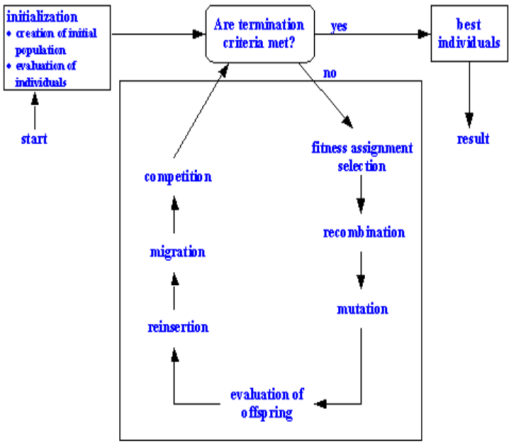

Fig 1 Evolutionary Algorithm

4. PROPOSED SYSTEM

The proposed method uses the evolutionary algorithm to study the stock level that needs essential inventory control. This is

the pre-requisite idea that will make any kind of inventory control effective. For this purpose, we are using K-means clustering as assistance. In practice, the supply chain is of length n , means having n number of members in supply chain such as factory, distribution centers, suppliers, retailers and so on.

5. METHODOLOGIES

Manufacturing flow management (MFM)

Order fulfillment (OF)

Demand management (DM)

Manufacturing flow management (MFM)

Manufacturing flow management (MFM) is the SCM process comprising all actions required to transport merchandises over the company in addition to attaining, employing, and bringing about manufacturing flexibility in the supply chain.

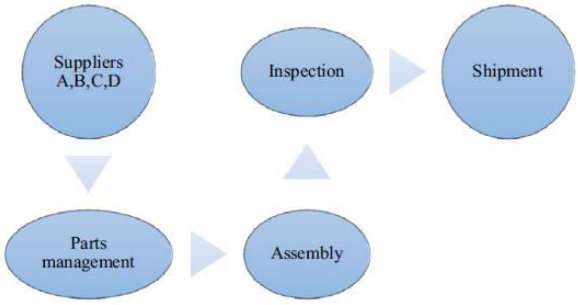

Fig 2 Manufacturing flow management

Order fulfillment

An order that completely fulfills customer requirements within its completion is termed as a ‘‘perfect order’’. Order fulfillment (OF) is one of the vital parameters to reflect client service performance.

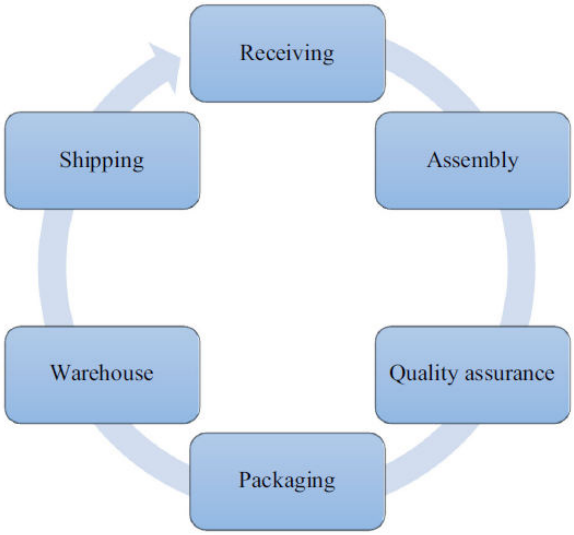

Fig 3 Order fulfillment

Demand management

Demand management (DM) comprises all the demand activities, including market sensing, market creating, marketing, and demand capturing. It has two major sub practices: sales forecasting and bullwhip effect.

Constraints of Evolutionary algorithm

In real life dispatch planning, there may be many constraints that the system has to deal with. Some of the likely constraints are described below.

- A fuel station may require more than one type of fuel. However, each truck is allowed to carry only one particular type of fuel in one dispatch. ·
- The planning should be flexible enough to handle certain priority cases. Priority may be accorded for situations, including extreme shortage of fuel, projected depletion of fuel, operator imposed priority and so on. ·
- Typically, fuel delivery is to be completed within a certain time limit. Certain timing elements such as truck speed, fuelling time, rest stop may also be considered. ·
- Trucks are allowed to make multiple trips from the terminal station. ·
- The number of trucks may vary. ·
- The system should be upward scalable in terms of the number of stations.

6. CONCLUSION

Real-life applications of stochastic algorithms need to consider trade-off in solution quality and computational efficiency. One such application is the problem of planning the dispatch of fuel in order to replenish the supply of refueling stations, an important aspect of supply chain management. Our solution methodology is an evolutionary algorithm with a layered chromosome decoding strategy. we also focus on to specifically determine the complexity in predicting the optimal stock levels and shortage level required for inventory optimization in the Electronic components Supply Chain management for environmental collaboration such that the total Electronic components Supply Chain inventory management cost is minimized .we apply our methods on Electronic components Supply Chain management for environmental collaboration studied model for optimization.

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