Model based on Hybridized Game Theory to Optimize Logistics: Case of Blood Supply Chain

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Abstract

Several researches have been done to optimize different flows in blood supply chain. However, the use of game theory in this sense is rare. The following work focus on the case of Morocco, consisting of 16 Regional Blood Transfusion Centers (RBTC) centralized around a National Blood Transfusion and Hematology Center (NBTHC). An approach based on hybridized game theory is adopted to form core and strongly stable coalitions and optimize as much as possible the transport cost. Firstly, the optimal cost of each coalition of the 33 possible coalitions; that the Director of NBTHC validated; is computed by using a mixed integer linear Programming model (MILP). Then these costs are introduced as data of two other MILP to define which structure minimizes the total cost allocated to each RTBC while maintaining core stability, in the case of the first MILP, and strong equilibrium in the case of the second. The VRPPDTW is also introduced within each coalition in order to optimize the cost of transport more.

References

Index Terms
Computer Science
Artificial Intelligence

Keywords
Optimization, Game theory, Blood supply chain, Collaborative logistics, VRPPDTW