Optimum Logistic Cost Cluster Size of Multiple Facilities and Server Systems

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Declaration

"I declare that this is my own work and this thesis/ dissertation does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any University or other institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text"

Signature: Date:

Declaration

"I have supervised and accepted this thesis for the submission of the degree"

Signature of the supervisor: Date

Dedication

To my loving

Father, Mother and Sister who always stand beside me encouraging, guiding and helping in every way when I come across numerous ups and downs.

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K.P.H. Perera

~~Abstract~~Abstract

Optimum Logistic Cost Cluster Size of Multiple Facilities and Server Systems

Demand for a particular facility can be exceeded due to the continuous growth of consumers. Therefore the existing competition can also be increased. This will boost the forming of new facilities providers and also increase supplying capacity of existing facilities providers. The location of new facilities and the distribution pattern will be important which causes the system efficiency and the cost of the final product.

Identification of the facility locations were usually done by considering the geographic positions or sometimes randomly based on locations of suppliers and consumers. When there are interactions among the different facilities and/or between the facilities and a central server, this practice may become inefficient and the transportation cost may also become higher than the optimum.

The problem of locating facilities provider and allocating consumers to optimize the transportation cost covers the core topics of this research. This report describes the formulation of a mathematical model according to the facility requirement. This model can be applied in to transportation requirements based on direct shipment network and/or milk run networks with centralized distribution system.

Transportation problem and center of gravity methods were used to develop the proposed methodology. Model initiate with the center of gravity model with relevant operational factors to locate initial plant location for basic goods movement patterns according to the existing demand points. Then the model was executed to next step to expand the system with more facility locations using both single index transportation model and center of gravity model. The final model was capable to work with several types of facilities which were more advanced using multi-index transportation problem and center of gravity model. The transportation cost was assumed to be proportionate to the road distances between the origin and destination which was relaxed by using an individual factor to accommodate the optimum location of facility center within the cluster. Operation requirements such as the concrete delivery time of concrete transportation etc. also introduced to enhance the model practicality.

Key words: Optimum Cost Cluster Size, Facility Location, Multiple Transportation Problem etc.

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