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## **Design of Multi-Echelon Supply Chain Systems to Optimize Cost and Service Levels**

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**Abstract:** Primarily found basic uncertainties in the supply chain design are supply and demand, later there are many more uncertainties added in the literature of the field, e.g., control. For an organization there are many options available to implement in the area of supply chain design and uncertainty, whether to find the root cause of the uncertainty, or to reduce the risk, or to optimize the process to handle the uncertainty more conveniently, etc. From all these alternatives, this thesis is concentrated on the reduction of uncertainties by answering with the available resources. Therefore, the focus is on optimization of cost and service levels with proper utilization of the network echelons. There is a mathematical model presented in the paper, which is a mixed integer linear programming (MILP). Along with the cost reduction and service level maximization, this research is also directed towards variability reduction by aggregating the customer zones to reduce the volatility in service levels, and in turn higher service levels. The research has future scope to be explored and identified to add dynamic factors.

*Keywords:* Supply chain design, Service level volatility, Multi-echelon