

Logistics network design



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LOGISTICS network design is concerned with the purpose of the number and site of warehouses and manufacturing plants, allocation of customer demand, distribution of warehouses to production plants. The best configuration must be able to deliver the goods to the customers at the least cost (commonly used objective) while satisfying the service level needs. In most logistics network design models, the customer demand is exogenous and defined as a consistent quantity for each product. Such a uniform demand value does not take advantage of the possibility that different customers have different sensitivity to delivery lead-time.

Logistics network design is a vital strategic decision for Audi. It is very important to allocate the customer demand points to warehouses, and allocate products from warehouses to production plants. As Audi have become more global, there has been a trend towards outsourcing the logistics function to third-party logistics (3PL) firms, so that manufacturing companies can focus their efforts on their core competencies. Thus, 3PL companies must have the capability to design efficient and effective logistics network so as to add value to their clients' business. Audi is excellent in this.

In Audi Company, we see three new models for logistics network design with special focus on the perspective of 3PL companies. The chief objective of these new models is to increase the effectiveness of the resulting network design and the utilization of facilities in the network.

The three models encompass the following areas:

1. Logistics network design with differentiated delivery lead time,
2. Logistics network design with price discount, and

3. Consolidated logistics network design using consolidation hubs.

A new perspective of Audi that incorporates into logistics network design are, two factors namely delivery lead time and price discount that are usually not considered. This shows that designing network with differentiated delivery lead time can reduce the network cost, while the other shows that combining pricing decision and demand management can result in a network design with higher net profits, combines tactical decision for inventory replenishment policy with strategic decision for consolidated network design. These shows by adding consolidation hubs at suitable locations near to the suppliers, we can leverage on concave Audi's cost to reduce the overall network cost.

Network design and inventory replenishment policy simultaneously our findings provide managerial insights into how 3PL companies can and their results to improve their business. Audi design more effective logistic networks to support their clients and Audi is applicable to the order fulfilment business process and managing suppliers for manufacturers. As every part is made by Audi but work is divided into different department, for example tyre, machine etc are produced in different plant.

Audi is designing a network according to demand classes segmented according to their sensitivity to delivery lead time. This shows that potential network cost savings can be achieved by designing a network with segmented customer demand as compared to a network without segmented demand. For the segmented demand case, the short LT demand customers are served from their local warehouse or a nearby warehouse which can satisfy the delivery lead time requirement; while the long LT demand

customers are served directly from the hub which is located further away. In addition, the model explored the multiple facilities grouping method which groups facilities which can serve the same customer location within the short LT requirement. It was shown that multiple facility grouping can reduce the network cost, especially for networks with lower inventory holding cost and high fixed facility cost.

Network Design: Key Issues

- Pick the optimal number, location, and size of warehouses and/or plants
- Determine optimal sourcing strategy
- -Which plant/vendor should produce which product?
- Determine best distribution channels
- -Which warehouses should service which customers?

Data for Network Design

1. A listing of all products
2. Location of customers, stocking points and sources
3. Demand for each product by customer location
4. Transportation rates
5. Warehousing costs
6. Shipment sizes by product
7. Order patterns by frequency, size, and season, content
8. Order processing costs
9. Customer service goals