

SUPPLY CHAIN MANAGEMENT

Unit-IV

Network Design in the Supply Chain:

The supply chain network design is defined as a working model that delineates the overall framework of a supply chain to assess the time and costs required to bring goods to the market. This model helps a business spot inefficiencies and potential risks in the supply chain.

What is the goal of a Global Supply Chain Network Design?

The key objectives of a global supply chain design are to optimize inventory, working capital and logistics costs. It also increases visibility, identifies opportunities for cost savings and reduces potential risks.

Supply network design reinforces the supply chain by mapping and modeling processes and optimizing them to ensure that products or services are delivered on time and in a cost-effective manner.

What is the Importance of Supply Chain Network Design?

Analysts in a [GEP white paper on the importance of supply chain network design](#) said that 80% of supply chain costs are determined at the designing phase of the product and supply chain network. Thus, failure to consider network design can cost the enterprise dearly and be counterproductive in the longer term.

Simply mapping a global supply chain network, its flows, timelines, current costs and revenues generated can generate a bunch of troubling yet important questions, such as:

- Why are the enterprises' only suppliers based overseas?
- Why are there so many warehouses, and why in those locations?
- Why is there so much dead stock? Why has more inventory been ordered?
- Why are freight and trucking costs so high?
- Is the current network design efficient?
- Is the supply chain design aligned with the enterprises' sustainability goals?

What Are the Benefits of Supply Network Design?

Supply chain network design or SCM network design helps enterprises simulate and visualize their supply chains to optimize them. [Optimization of supply chains](#) reduces overall costs and enhances service, speed-to-market, flexibility and risk mitigation.

Here are the key benefits:

- Discerning parts for streamlining and potential cost savings
- Reduction in purchase costs and inventory
- Working capital reduction
- Reduction in freight costs
- Route optimization for reducing transit time and fuel costs

- Reduction in network fixed costs (facilities, equipment) and supply chain variable costs (labor, handling, 3PL costs)
- Optimization of service levels and delivery dates for customer satisfaction
- Process and cost visibility across the supply chain network
- Providing performance visibility of the complete supply chain network by comparing its capabilities/costs against set benchmarks

What Factors Are Considered While Designing a Supply Chain Network Model?

To start with, enterprises must establish a benchmark, and to do so, the following components must be considered:

- Define the objectives as aligned with the enterprises' objectives and the supply chain design model parameters, such as capacity issues, inventory replenishment lead times, customer needs, location of facilities and sources and so on.
- Collate the required data, such as forecasts and future trends.
- Use network optimization tools and necessary data for building a “living” model, incorporating the defined parameters and data collected.
- Validate the model with historical "what if" scenarios and compare the outcome with known results.
- Finalize the supply chain network design and implement it.

How Many Types of Supply Chain Network Design Are There?

Enterprises deciding to assess their supply chain network design must zero in on the type of SCM network design to be adopted.

The three types of supply chain network design are:

Strategic Network Design:

Here, the designing of the network — location of the facilities and sources, production and warehouse capacities, market strategies — must be aligned with the objectives of the business.

Tactical Network Design:

Here, different ways to optimize the existing network are explored for implementing short-term planning decisions.

Identifying Risks and Their Mitigation:

Here, risks are identified by asking “what if” questions. A plan of action (PoA) for managing each identified risk is then made.

What are the four stages of supply chain network design?

Here is a proven process for designing a supply chain network that best meets your business objectives.

Designing Supply Chain Network: A Proven Process

- Clearly define your objectives. ...
- Gather supporting data. ...
- Model your supply chain network. ...
- Analyze your supply chain network.

What are the six steps in supply chain network design process?

- The six steps. ...
- Step 1: Orient the project. ...
- Step 2: Define the variables. ...
- Step 3: Analyze the sensitivities. ...
- Step 4: Create scenarios. ...
- Step 5: Evaluate the alternatives. ...
- Step 6: Detail and do. ...
- SNP: The difference between good and great.

What are the three levels of supply chain network design?

Supply Chain Management (SCM) involves the following three levels:

- Strategic Level.
- Tactical Level.
- Operational Level.

What is the objective of supply chain network design?



The objective of supply chain network design is **to balance service level against production and purchasing costs, inventory carrying costs, facility costs, transportation costs and risks.**

What factors affect network design?

When it comes to network design, there are four critical considerations that you need to take into account if you want a network that is reliable, secure, and runs smoothly. These include **embedded security measures, standardization of software and hardware, network resiliency, and redundancy**.

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Network Design in an Uncertain Environment-Sourcing Decisions in a Supply Chain:

What is network design decisions in supply chain?

Supply network design **reinforces the supply chain by mapping and modeling processes and optimizing them to ensure that products or services are delivered on time and in a cost-effective manner.**

What is uncertainty in supply chain design decisions?

Supply chain uncertainty refers to the decision-making process in the supply chain in which the decision maker does not know exactly what to decide due to lack of transparency of the supply chain and the impact of possible actions.

How does uncertainty impact supply chain network?

In supply chain planning, uncertainty **causes dynamic tension**: do all the right things to improve the forecast, and hit a ceiling on the way to accuracy. The fact is, inherent in supply chain planning are volatility and randomness of thousands, if not millions, of individual buying decisions and supplier activities.

What are the uncertainties that influence supply chain performance and network design?

Several parameters of a SCND problem, such as **costs, demand, and supply**, have inherent uncertainty. Moreover, SC networks can be affected by major man-made or natural disruptions such as floods, terrorist attacks, earthquakes, and economic crises.

What are the five factors of uncertainty in the supply chain?

Some of these factors may significantly increase the uncertainty in a supply chain network, but other frequent parameters of uncertainty are **product demand, raw material prices, costs (energy, labor, production and transportation costs) and lead times**.

What are the network design decisions?

Network Design aims to define:

Manufacturing Facility design - Location, Number of factories, size of unit, time frames for the plant setup project etc. Finished Goods Supply Chain network - Number of warehouses, location & size of warehouses, inventory flow and volume decisions, transportation.

What are the supply chain network design process steps?

Here is a proven process for designing a supply chain network that best meets your business objectives.

- Clearly define your objectives. ...
- Gather supporting data. ...
- Model your supply chain network. ...
- Analyze your supply chain network. ...
- Implement and refine.

What are the three levels of supply chain network design?

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What is an example of uncertainty in decision-making?

A newspaper vendor must decide how many copies to purchase each day in the face of uncertain demand, knowing that any unsold newspapers at the day's end will be worthless. A naïve solution would be to take the average number of copies sold each day and purchase that many.

What are the sources of uncertainty in decisions?

The five sources are:

- Missing information. We can be uncertain because we are missing important information. ...
- Unreliable information. We can be uncertain because we aren't able to trust the information, even if we have it. ...
- Conflicting information. ...
- Noisy information. ...
- Confusing information.

How do you manage uncertainty in a supply chain?

Preparing Global Supply Chains Against Uncertainty

1. Include risk management in your sourcing strategy. ...
2. Audit the financial, operational and balance-of-trade exposure of your most strategic and mission-critical suppliers. ...
3. Look for early warning signs. ...
4. Increase the frequency of supplier performance reviews.