Practical, Affordable Network Modeling

Optimize your distribution network at a fraction of the time and cost of large-scale studies.

Network modeling approaches:
One size does not fit all

Supply chain network modeling was once done on Excel spreadsheets using latitude, longitude and rough data. These rudimentary "centroid" models estimated the middle between suppliers and customers. Today, we have very powerful supply chain optimization tools capable of comparing the cost and service implications of countless strategic alternatives.

The problem is companies use these sophisticated tools to support a wide range of supply chain analysis tasks, often spending far more time and money than is required.

If the challenge is banging in a nail, *sometimes all you really need is a hammer.*

Comprehensive supply chain modeling projects are excellent for strategic decisions, such as determining the number, size and location of distribution centers (DCs) in a new network, as well as stocking of inventory and labor factors. For that analysis, you'll pay a price – in time and money.

It can run anywhere from $100,000 to $1 million for very large projects and take an average of 20-24 weeks to complete.

But if all you need to know is the actual cost and service impact of a *specific change* to your network – like whether moving your DC from Chicago to Memphis can save money without sacrificing service – then a practical network modeling project is quick and affordable.

Within 2-3 months, you'll have your answer for between $20,000 and $50,000.

This paper discusses the PROs and CONs of the strategic versus the practical approaches and how to incorporate practical, affordable network modeling into your supply chain tool kit.

The downside of comprehensive supply chain optimization studies

Strategic supply chain modeling projects are excellent when you need to examine many potential choices – for location, service levels or transportation modes. Once the data is loaded, sophisticated modeling tools use programmed algorithms to examine dozens of "what if" scenarios at lightning speed.

But there's a dark side. Algorithms are based on averages and aggregates, which can lead to inaccurate data and misleading conclusions. Further, these modeling exercises may be sophisticated and fast, but if they are processing incorrect data, you'll get incorrect results. Garbage in is still garbage out, no matter how fast you calculate it. Some additional downsides to strategic modeling projects include:

- **Practical logistics issues are not considered.**
  Lets say a strategic analysis for a complex network suggests Gary, Indiana as an ideal central distribution point. Nothing against Gary – after all it was the birthplace of the Jackson Five – but there's very little freight volume there. Transportation costs would be far more than the model suggests. Part of the problem is that modeling work is often done by engineers fresh out of school who lack the practical know-how to challenge the output from the tool.

- **Actual transit times won't be spot on.**
  Supply chain modeling tools measure distance as the crow flies, not as the truck drives.

- **Labor and real estate costs can be inaccurate.**
  Use of averages here can give a false read. And models won't capture practical issues, such as labor availability, the existence of an onerous state inventory tax, or which states offer aggressive tax breaks to attract new logistics development.

Before proceeding with a strategic modeling project, make sure your challenge warrants the significant time and cost.

Why practical network analysis is often the best option

While strategic supply chain models allow you to explore many distribution network options at a high level, practical network models are more granular. They are preferred when you want to know the precise cost and service impact of specific options for location, service level or transportation mode.

Practical modeling projects deliver very precise cost estimates.

By limiting the number of strategic options for analysis, you can use actual transportation, warehousing and inventory costs. Actual shipments are re-rated from different shipping locations to determine the change in cost and service with each scenario. Carrier times and transit standards used are also actual, so the analysis results in highly accurate cost and service level estimates.

In addition to the accuracy of the results, benefits of a practical network modeling approach include:

- **Lower costs.**
  The $20,000 to $50,000 cost will typically pay for itself within one year of implementing the recommended network.

- **Rapid implementation.**
  The targeted distribution network analysis can be completed in 2-3 months, sometimes 6 weeks, versus 5-6 months for a comprehensive supply chain analysis.

- **Reliable results.**
  Details can be shared with upper management to drive decisions and establish budgets.

A comparison…

Strategic Supply Chain Modeling	Practical Distribution Network Modeling
Good when starting with a "greenfield" or constantly expanding network and examining a wide range of options	Good when comparing specific options
Delivers estimated costs for a wide range of options	Delivers actual costs for a specific set of options
Uses average and aggregate data for calculations	Uses actual data gleaned from your own historical files
Relies on the modeling tool but often does not examine all practical considerations for the full range of options	Relies on the proprietary modeling tool for number crunching but supplements that with an examination of practical logistics considerations
Uses estimated transit times and rates	Uses actual transit times and carrier rates using PC Miler
Large budget exists for analysis	Limited budget exists for analysis

Matching strategic challenges with the right modeling approach

Use a strategic supply chain modeling approach…

If you are *buying* companies on a regular basis and need to frequently assess the impact of new acquisitions on the supply chain.

If you are developing an optimized distribution network for national distribution and want to know where to locate DCs and what it will cost.

If your ship-to points are constantly changing, like a retailer adding 20 stores per year, and you need a fluid network model that allows you to regularly assess optimal shipping points.

Use a practical network modeling approach…

If you *merge* with another company and need to determine which of two DCs is the best option for a single-DC network.

If you have decided to open up a new DC in a new region and want to explore the cost and service implications of several location options.

If you are considering consolidation of two warehouses and want to know if that will increase costs.

If you are considering adding a DC to your network and want to know if this makes sense from a service and cost perspective.

A $24 million error:
Strategic network optimization gone wrong

A third party logistics provider (3PL) for a large medical device company conducted a strategic network modeling study that suggested the potential for $25 million in savings over five years from relocating and consolidating existing distribution centers.

Because the predicted savings were so large, the company wanted to validate the findings with an objective opinion and commissioned a more targeted study by a transportation specialist.

This follow-up study found that the initial analysis made a *critical mistake*.

It assumed distribution could occur from the manufacturing plants. However, there was no space to handle distribution, so newly manufactured products at some sites would have had to be transported to distribution centers, sometimes at a *premium, expedited cost*.

This freight cost was missed in the model, which looked *only* at the final distribution leg from the DC to the end customer.

The follow-up analysis to validate the findings considered all post-manufacturing legs in the supply chain and concluded that the savings potential ***was only $1 million*** – for the exact same reconfigured network.

Based on this second analysis, the company decided to go back to the 3PL and have them reconfirm their numbers. The medical device company did not go forward with the recommended changes.
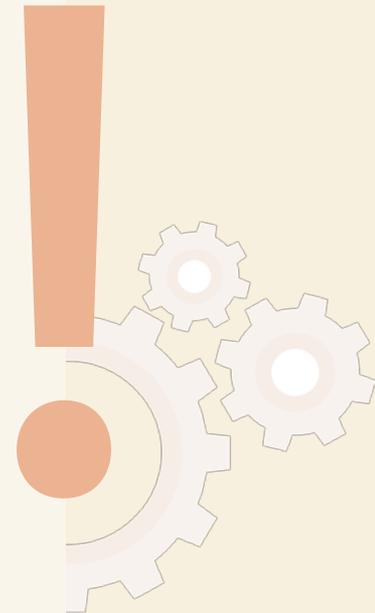
Steps in executing a practical, affordable network modeling project

1. Understand your goal.
Do you want to reduce costs? Improve service levels? Reduce your carbon footprint?

2. Define the scope of work.
For instance, "Find the economic center of gravity for all shipments and relocate there without impacting service levels."

3. Collect the data.
You'll use real data for each mode of transport. The data may exist in your internal systems, but chances are you'll need to go to carrier and 3PL partners to collect all the required data.

4. Clean the data.
Some bad data is inevitable, such as LTL freight without classification, parcel without cost breakout and lack of TL origin/ destination points. Once you're comfortable the data is clean, your partner on the modeling project will build the "as is" baseline for service and cost. This serves as your point of comparison for evaluation of other options.

5. Build the models.
This typically involves taking a year's worth of activity by every mode and calculating the new costs and service levels from alternate DCs.

The goal is to make the analysis as accurate as possible by using actual shipping activity and invoices.

Also, sacred cows are identified up front so the model does not factor in changes that will never happen. For example, if you have a carrier partner for late pick-ups that you want to retain, the model will include this assumption.

Choose the right tool for the job

In business, customers constantly change.

If your distribution network does not adapt to meet changes in demand, then you are likely paying more than you should (potentially millions more) to get products to market.

Many companies that could benefit from a careful analysis of their distribution network hesitate because they believe the project can't be done within their timeframe and budget. But a large portion of these companies don't need a comprehensive supply chain analysis.

What they need is a practical, affordable network analysis that can provide them with a highly accurate cost and service estimate for a defined set of strategic alternatives.

A carpenter doesn't invest in sophisticated and expensive tools unless they are required by the job.

When it comes to your distribution network, first figure out what you need to know, then decide if a modeling exercise is warranted and what type of analysis is best.

Remember, sometimes a hammer is all you need.
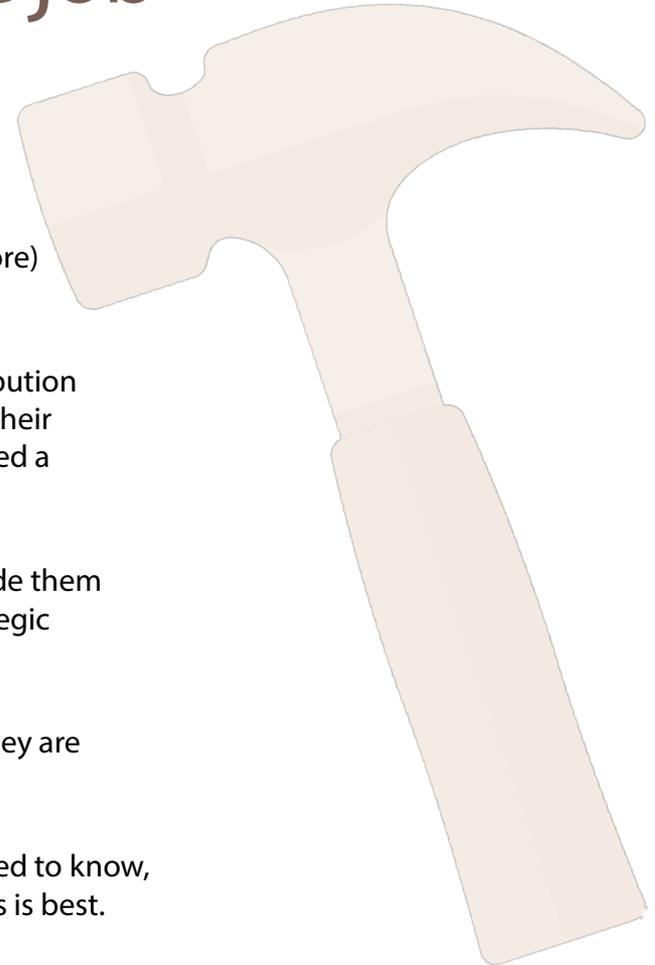
About the author

Giles Taylor is founder and president of Trans-solutions – a transportation consulting company that helps businesses make critical freight management decisions that result in savings of 5%–25%. The company delivers precise, objective answers to real-world logistics challenges based on a fact-based, numbers-driven approach.

His clients include companies, large and small, from a variety of industries, including pharmacuetical, medical device, specialty retailers, e-tailers, wholesalers, and consumer goods.

In the area of distribution network modeling, Trans-Solutions specializes in practical, affordable analysis projects that give companies the information they need to make critical decisions about how to get products to market.

Contact Giles Taylor to learn how Trans-solutions can assist in crafting your distribution network strategy.

Contact Giles

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