Network Planning and Optimization: Tools Continue to Gain Traction

Is there any doubt that to prosper or even survive today, companies need to have intelligent, resilient, low cost and flexible supply chains?

The answer is an obvious “Yes.” Getting there is the hard part.

For more than a decade, an important part of the supply chain technology mix has been to use a class of supply chain solutions most often known as Supply Chain Network Planning and Optimization software to help craft supply chain networks.

Due to a wide array of supply chain dynamics, there has been a growing demand for network planning and optimization solutions over the past three years. The technology landscape has also become a bit more confusing in that time, as related types of solutions (supply chain simulation, network inventory optimization) have also entered the field (see sidebar on page 6).

Case Studies: Moving to Continuous Network Optimization

One of the most important trends in supply chain management right now is the growing number of companies that are using supply chain Network Planning and Optimization tools on a continuous basis.

Supply Chain Digest believes this is a more important trend than many in the industry understand, with a huge impact on supply chain competition. In the past, companies operated their supply chain network strategies on a fairly even playing field — most only re-optimized those network strategies every few years, often based on some catalyzing event, such as a merger. Now, a growing number of companies are using Network Planning Tools to continuously tweak supply chain network strategies and support tactical supply chain decisions.

The Supply Chain Digest Letter believes this has the potential to give those companies a significant operational advantage over companies that take a more standard, static approach, or do not use this level of intelligent technology support to make supply chain decisions. This is especially true as supply chain networks become more complex and dynamic.

The flexibility, speed of response to opportunities, and supply chain cost reduction that companies taking this approach can achieve should provide a substantial competitive advantage — impacting both the revenue and the cost line.
Supply Chain Network Planning Thought Leaders Discussion:
The Rapidly Evolving Role of Supply Chain Network Planning Solutions

Supply Chain Digest’s Dan Gilmore recently spoke with i2 consultant Ken Justin on the rapidly evolving use of Network Planning tools. Excerpts of that interview are printed below. The full discussion is available at www.scdigest.com/letter

Gilmore: Ken, What do you think is the biggest misconception about network optimization solutions today?

Justin: I’d say it's the lack of appreciation for both the depth and breadth of business problems they can address. Historically, people considered network planning solutions to be facility location studies on the distribution side. Our customers are utilizing our Supply Chain Strategist and Transportation Modeler products to assess trade-offs in the manufacturing, procurement, market planning, and transportation areas as well. In most cases trade-offs within and between these areas are being optimized and analyzed simultaneously.

I also think many people view network planning solutions in terms of long term infrastructure plans. Our customers have been successful using our tools for tactical and operational decisions. Corporations have leveraged our multi-period modeling approach to generate monthly or weekly decisions in terms of inventory stock-up of policies, various outsourcing needs, purchasing decisions, and the sizing of labor shifts and overtime needs.

Gilmore: We're also seeing that trend. I'm also curious about success factors. What separates the companies that drive the most value from those that achieve less value?

Justin: First is the correct level of executive sponsorship. Network planning cuts across multiple corporate domains or stakeholders, such as procurement, finance, logistics, etc. The level of executive sponsorship needs to be high enough to ensure the company has the support needed to execute on the actions and policies resulting from the analysis.

Second is the involvement of the stakeholders’ key personnel. Network planning studies often involve business process reengineering. The right people have to be involved to represent the value and repercussions of these changes on their own areas of operations. Often, the costs and constraints represented in network planning models are soft, meaning an analyst cannot just pull them from a corporate database. Each stakeholder must be familiar with the assumptions, soft costs and constraints, as well as the sources of data for the hard costs and constraints.

Finally, I’d say in the most successful projects the core analysis team or individual that owns all the data requirements and modeling assumptions is responsible for executing the optimization runs, and provides the primary analysis and insight. The analysts need to understand the core business and build a strong relationship with the stakeholders. Companies achieving the greatest value use a team of senior analysts that mentor junior analysts on the best practices in network modeling as well as the nuances of their company’s particular industry domain.

Gilmore: How have today’s solutions made it easier for companies to use these tools on a more continuous basis?

Justin: When Supply Chain Strategist first came to market 12 years ago it provided an intuitive user interface, flexible modeling paradigm, and scenario management. Today, network planning solutions are as easy to use as a Microsoft Office application. This lowered the training barriers and allows customers to gain an appreciation of the modeling assumptions and the process behind making these decisions and suggesting alternatives. This has led customers to create in-house teams that continually develop and run models and assess trade-offs as the dynamics of their particular business evolved.

The next stage of innovation was compressing network planning decision making from strategic (annual or greater) to tactical (monthly or weekly). Tactical models provide a stronger business case for companies building an internal core competency in continuous value generation. From the product side, in addition to building multi-period data models and constructs, scalability requirements changed. Tactical models can be 10 or 100 times larger than strategic models. The major area of investment and ingenuity to move to this next generation of tools was the optimization
technology. Multi-processor solving techniques, advanced cut-generation, 64-bit utilization along with general improvements to computer power allowed our users to optimize broader and more detailed business problems.

*Gilmore:* What are some of the more interesting or emerging uses for these tools you see your customers adopting?

*Justin:* Contingency planning and the concept of supply chain resiliency is one example. Accounting for risk is a critical part of any supply chain design. Companies cannot afford to build supply which minimizes costs for the best case scenario. A resilient supply chain eliminates single points of failures in the system. Companies need to be willing to pay for some infrastructure or contingencies to account for unexpected events. Network planning models need to introduce stochastic events or uncertainty into the optimization.

For a complete transcript of this expert discussion, visit www.scdigest.com/letter

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This last trend is critically important and has significant implications for a company's approach to its supply chain strategy and the technology needed to support supply chain excellence.

Respected analyst firm Gartner recently summarized one aspect of this important shift. “Examining and analyzing the dynamics of a global supply chain more effectively and having the capability to frequently review subsequent supply chain designs (at least quarterly, if not monthly, and on an as-needed basis) will have a significant effect on overall competitive advantage,” Gartner noted.

**Solution and Situation Overview**

Network Planning and Optimization software helps companies to create an “optimal” supply chain network – in whole or part. The software works by using sophisticated mathematical modeling and optimization “solvers” that will identify, based on company objectives (e.g., maximize total profit), a wide range of constraints (e.g., customer A must have a distribution point less than 500 miles away), what is, on paper at least, the optimal network configuration.

The scope of questions to be answered can be as wide as the entire supply chain, or as narrow as which existing factory offers the lowest total supply chain cost to produce a new product. The tools have their roots in logistics network optimization, specifically answering questions around how many distribution points a company should have, where they should be located, and how to minimize transportation costs. In that context, the tools were generally used periodically, in 3 to 7 year cycles. The typical catalysts were:

- The growing “pain” of deteriorating logistics cost and performance
- An external event, such as a significant merger acquisition
- A major change in strategy (e.g., moving to distribute to end customers directly rather than solely through distributors)

When one or any of several other triggers occur, how does a company even begin to understand its options and find the optimal answers? An executive from Shaw’s Supermarkets, a regional grocery store chain, recently summed up the situation well: “Without use of Network Planning tools, the first idea of what to do would come as a suggestion from somebody’s mind within Shaw’s,” the supply chain manager noted. “We would do an analysis of whether or not the idea was better than something we’ve done in the past and go from there. The analysis was done manually, and did not consider multiple solutions at the same time.”

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**Shaw’s Supermarkets**

While the necessity and benefits of single point-in-time optimizations are well understood, a variety of market and supply chain forces are causing companies to greatly expand their use of these tools. Supply Chain Digest believes this trend represents a substantial and important change in supply chain management strategy and the role of supply chain technology, changes that have not been fully appreciated by many companies in the industry.

These expanded “use cases” include the following:

**Managing from an Integrated Supply Chain View**

While the theory of Supply Chain has always been based on cross-functional optimization, the reality is that most companies still operate at some level of functional silos. This requires a more fundamental analysis of the network that looks to answer not just narrow questions that impact...
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A particular function (though this remains part of the use cases most times), but also the goal of crafting a more holistic strategy that considers the full breadth of cross functional supply chain options. While every company answers these questions within some set of constraints that limit the “degrees of freedom,” Supply Chain Digest has recently spoken with several companies that have significantly expanded the scope of their analysis to include very broad and deep consideration of the entire supply chain.

Focus on Total Profit Optimization

The impact of supply chain performance on the bottom line and shareholder value are increasingly well understood. As a result, companies are looking at supply chains not just from a “cost minimization” perspective, but in terms of maximizing profitability – and return on capital.

While answering these questions was always possible with the tools, the reality is that most analyses were driven by minimizing cost given some level of “fixed” demand.

Today, an increasing number of companies are using the tools to understand instead how to “maximize profits” – which turns out to be a much different question. It means evaluating multiple scenarios to see how changes in go-to-market plans, including both demand and supply strategies, will deliver total financial benefit. Companies are also increasingly using the tools to not only understand the capital requirements for different alternatives, but how those choices impact total return on capital – a key financial metric for many corporations.

Use in Tactical Planning

A wide number of companies are now using Network Planning and Analysis tools not only to support more truly strategic analyses and decisions, but also much shorter term, tactical supply chain decisions. In fact, most of the companies that embrace Network Planning solutions for use on a continuous basis begin to migrate towards more tactical use – answering more focused and near-term questions. An easy example: managing “end of life” scenarios for a specific product in a way that maximizes profitability (e.g., when does it make the greatest sense to stop production of the product in one of the two plants where it is manufactured?).

Companies are increasingly taking the strategic models that have been built, which may encompass 2-3 years broken down in monthly or quarterly time buckets, and spinning off “smaller” models that can help make tactical decisions about inventory levels, production line start-up and shut down, and other shorter term decision requirements.

We also spoke with a consumer goods company that had started to use its Network Planning tool to support its Sales and Operations Planning process. While in the past the tool was considered useful for only a small group of supply chain network design experts, the company found that the insight produced by the tool was extremely useful in making the long and mid-term planning decisions that were at the heart of its S&OP process.

Solution Description:

i2 Supply Chain Strategist™ helps enterprises to analyze and design their supply chains to best meet business objectives. The solution is designed to support key strategic decisions at each stage of the supply chain; from raw materials procurement to finished goods distribution. The solution can provide insight into the trade-offs between alternative strategies regarding site location, facility missions, product mix, transportation strategies, inventory deployment strategies, and supply chain operations.

Strategic planning using i2 Supply Chain Strategist is designed to enable an organization to:

- Minimize costs while serving committed demand
- Maximize profit while serving committed demand

The solution also supports a number of more tactical planning scenarios. i2 also provides network simulation, transportation modeling, and inventory optimization solutions.

Key Customers:

Cooper Tire & Rubber, Tyco Healthcare, Pepsico/Frito-Lay, Shaw’s Supermarkets, and many other supply chain leaders from both large and mid-sized enterprises.

Web Site and Contact Info:

www.i2.com
Phone: 800.800.3288
info@i2.com

Featured White Papers/Collateral:

- Supply Chain Strategist Overview
- Cooper Tire & Rubber Case Study
- Shaw’s Supermarkets Case Study
The team that manages the “pre-S&OP” meeting, where the issues, data, and plans are first vetted, now makes extensive use of insight from the tool to help it understand the cost and profit impact of various alternatives they are considering.

“It helps focus the S&OP meeting on the real impact of the decisions, by the numbers,” the VP of supply chain at this company told us about their use of a network planning tool as part of sales and operations planning.

Use in New Product Introductions

Related to the more tactical use of these tools, an increasing number of companies are also using Network Planning tools to support new product introduction strategies. In the past, there was often a lack of integration between the product/demand side of the business and the supply side regarding such issues as the optimal production and storage points, optimal inventory targets through the product life cycle, etc.

Companies in the high tech, medical devices, and other rapid product life cycle industries are especially likely to use Network Planning tools to support new product introduction strategies, but we’ve also seen examples in pharmaceuticals, apparel, and consumer packaged goods.

Risk Mitigation

One of the major supply chain themes of the past two years has been the increased focus on eliminating or mitigating supply chain risk. Many companies now have much more formal approaches to dealing with risk, as the cost of “supply chain disruptions” on both financials and stock price becomes much more well understood.

Supply Chain Network Planning tools have become a key weapon in these risk mitigation strategies for many companies, allowing them to test multiple supply chain scenarios and to build in flexiblity and contingency plans at lowest total cost.

The related category of Supply Chain Simulation also plays a role in risk mitigation, enabling companies to see the impact over time of various designs and strategies as “events” unfold.

The trend towards more continuous use of Network Planning tools, and the expanded set of use cases, are obviously closely related. When integrated use of the tools into overall supply chain strategic and tactical decision-making processes, companies use the tools to help them answer an expanded set of supply chain questions.

Choosing the Right Tool

There are a number of Network Planning packages available on the market. While each company’s situation is unique, The Supply Chain Digest Letter offers these guidelines for selecting a tool that best meets your needs:

- **Breadth of Solution**: It may be useful to have several of the related tools available from one vendor, such as Network Planning and simulation, Network Planning and inventory optimization, or Network Planning and focused transportation modeling. Not all vendors of these tools have all the pieces.
- **Support for Manufacturing and Sourcing Decisions**: Based on their development histories, some of the tools remain more distribution-focused, while others provide greater depth of support for modeling manufacturing and sourcing scenarios. It is critical to deeply evaluate whether the tool you are considering can model your supply chain needs appropriately. The acid test: can the tool model the way you want to represent costs?
- **Solver Flexibility**: There are two elements to how well a tool can handle your scenario. The first is the underlying data model, as discussed above. The second is how flexibly the “solver” can be tuned to meet specific requirements. Are your requirements “special”? It’s important to ensure the tool can handle optimization of complex or unusual problems.
- **Scenario Management**: Network planning involves a series of “what if” analyses and comparison between options. The ability to retain multiple active “scenarios” and view comparisons between them is a critical differentiator in terms of user effectiveness. Some vendors are developing tools that enable “automation” of scenario analysis through use of “scripts.”
- **Handling of Time Periods**: There are differences in how the tools handle the analysis for different time periods. For example, moving from a single-time period (two year total cost analysis) versus looking at the same two years on a monthly basis. How well and easily the tool handles changes in the time horizon of the analysis should be reviewed.
- **Ease of Use**: The good news is nearly all of the tools have become easier to use today than they were a few years ago. Still, there are differences in the complexity of the set-up between solutions, though the biggest driver is the complexity of a company’s supply chain and the questions to be answered. Nonetheless, user effectiveness and the speed of model building are significantly enhanced by the ability of the software to identify problems or inconsistencies in the model as it is being built (e.g., product being manufactured in plant A is missing a raw material source). Look for the capability of the modeler to identify that such a problem exists and the specific cause during the model build process.
- **Financial Analysis**: Management will want to understand the impact of supply chain decisions not only on supply chain cost and profitability but a wide range of other corporate financial metrics. Handling of complex financial considerations (e.g., equipment depreciation, non-linear cost curves) also separate capabilities of the tools.
- **Global Trade Support**: For component sourcing and manufacturing location decisions, the ability to model complex global trade issues, such as duties, tariffs, duty drawback
and taxes, can significantly change the suggested solution.

- Reporting: While the goal of all the tools is to provide answers, there are still a lot of differences in the richness and flexibility of the reporting capabilities of each tool.

**Summing It Up**

Supply Chain Network Planning and Optimization software is “hot.” Globalization, the need to continually drive down costs, more integrated supply chain organizations, and the need for faster reaction to opportunities means the ability of individuals to develop the newest answers through use of experience and spreadsheets is quickly exceeded.

**Network Planning and Optimization: Tools Continue to Gain Traction**

Most large companies have used these tools on a sporadic basis in the past, generally in combination with a consultant. The big change is the use of the tools by a growing number of companies on a continuous basis, and their use to solve a new set of challenges, such as global sourcing and postponement strategies, new product introductions, risk mitigation, and more.

We are also seeing a trend towards more mid-market companies adopting these tools, such as Shaw’s Supermarkets (as mentioned previously), manufacturers Allumacorp and PC Tech, and many other companies that may have hundreds of millions in sales, not multi-billions. The Supply Chain Digest Letter strongly believes that companies that successfully implement these tools and use them on a consistent basis will have a significant competitive advantage in terms of cost, customer service, and the speed with which it can respond to challenges and opportunities.

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**Supply Chain Network Tools Classification**

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<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>How Used</th>
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<tbody>
<tr>
<td>Network Planning and Optimization</td>
<td>Tools that help companies design optimal supply chain networks, managing trade-offs between cost (manufacturing, distribution, inventory) and service.</td>
<td>Traditionally, used occasionally (every few years) as a strategic way to re-optimize supply chains, often focused on distribution networks. Today, used to solve a much wider set of problems, spanning manufacturing and sourcing, and used by many on a continual, even tactical planning basis.</td>
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<tr>
<td>Supply Chain Simulation</td>
<td>Tools which enable companies to evaluate how different network designs and strategies “playout” based on some sequence of events. Frequently based on “Monte Carlo” analysis — a statistical technique for simulating a pattern of occurrences (such as unpredictable short-term demand).</td>
<td>Enables companies to get a better feel for how real-time variability can impact supply chain performance and risk. For example, simulation might allow analysis of inventory positions, their deployment and how they are affected by changes in downstream demand signals, and the reorder policies in place to respond to those signals. It can also show how the “optimal” solution may leave a company vulnerable to an unlikely but potential series of events or variability of supply or demand.</td>
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<tr>
<td>Inventory Optimization</td>
<td>Tools used to identify optimal inventory levels and policies for a range of inventories, especially for those with multiple “echelons” of inventory stocking points.</td>
<td>These are tactical applications used to optimization safety stock and related inventory policies used to meet customer service targets with the optimal levels of inventory at each level of the supply chain, based on forecast demand. Also useful for making postponement decisions and navigating push versus pull versus hybrid inventory strategies.</td>
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**Network Planning Solution Profile**

**Solution Description:**
Founded in 1995 by David Simchi Levi, Professor of Engineering Systems at MIT, LogicTools provides strategic and tactical supply chain optimization applications designed to complement existing IT investments. LogicTools’ product suite allows companies to make a wide range of supply chain decisions, from choosing the best strategic network design, deciding on the most efficient sourcing strategy to optimizing inventory placement throughout the different levels of the supply chain.

LogicTools is headquartered in Chicago, IL and supports a global customer base across a wide range of industries. As a longtime SAP partner, LogicTools has helped many SAP customers complement their ERP and planning applications with optimization solutions. LogicTools’ network design solution is offered as a certified extension to mySAP™ Supply Chain Management and its inventory optimization solution is powered by SAP NetWeaver®.

**Key Customers:**
Cabela’s, Del Monte, Gambro, GE Healthcare, Limited Brands, Timken, and many others

**Web Site and Contact Info:**
www.logic-tools.com
Phone: 888-265-4706

**Featured White Papers/Collateral:**
- A Holistic Approach to Supply Chain Transformations
- Logic Tools Complements SAP

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**How Network Planning and Optimization Tools Deliver Value**
By David Simchi-Levi, CEO, LogicTools

As off-shoring and globalization of manufacturing operations continues to grow, supply chain complexity and risks have significantly increased. This, together with rising energy costs and the acceleration of merger and acquisition activities, has motivated many companies to reevaluate their supply chain network strategies in order to better utilize existing resources and infrastructure.

The challenges are daunting. How should the firm change its network to support business growth? How much redundancy should the network incorporate in order to deal with unexpected events? How can it leverage network structure to reduce transportation costs and better utilize capacities? What should be the sourcing strategy? How much inventory should the firm carry and where should inventory be positioned? How can the firm reduce the amount of expedited shipments and provide the appropriate level of service without increasing inventory?

In the last few years, many companies have applied the Network Planning solutions offered by LogicTools to address these challenges. Network planning is the process by which companies structure and manage the supply chain in order to:

- Find the right balance among inventory, transportation and manufacturing costs;
- Match supply and demand by positioning and managing inventory effectively; and
- Use resources effectively in a dynamic and changing environment.

**Network planning is typically a two step process:**

1. Optimize the structure of the network taking into account available capacities, seasonality, complex production constraints and the flow of products across the network. This also includes multi-site production planning and sourcing, focusing on where to produce different products. This also involves deciding between flexibility and specialization, that is between a flexible strategy in which each product is produced at multiple locations thus reducing transportation cost due to shorter distance to clients, or a strategy where each facility specializes in a small number of products, thus reducing production costs due to economies of scale.

2. Once the network is defined, determine where to place inventory; how much safety stock to keep; what is the right inventory mix at different locations; what are the key inventory drivers and how to increase service levels and decrease order fulfillment lead-times; also analyze postponement strategies; and which portion of the supply chain should be managed based on push and which should be managed based on pull.

The ability to optimize both the network design and the inventory positioning provides the most cost-effective solution to network planning. Many companies are currently incorporating LogicTools Network Planning technology into their roadmap alongside ERP and SCM implementations, and the results are impressive. Typical reduction in total logistics costs of 5-15% and significant increase in service levels, e.g., 20-25%, depending on the company and the implementation.
The ROI for Network Planning Software

Supply Chain Network Planning and Optimization tools provide an unusual scenario when it comes to cost justification. There are many examples of companies that have documented impressive bottom line results that would catch the attention of any CEO or board of directors. An executive at Dell, for example, said at a trade event a couple of years ago that it had achieved cost avoidance of hundreds of millions of dollars through better decision-making on supply chain and logistic strategies based on support from a network planning solution.

The potential benefits even from “one-time” exercises can be huge, and companies such as Dell, Frito-Lay, Tyco, Henkel, A&P and others that use the tools on a more continuous basis drive significant on-going benefit.

SCDigest ranked Supply Chain Network planning tools #7 on this year’s list of the top 10 supply chain and logistics strategies and technologies for 2007, based on the significant results we have seen an increasing number of companies experience. We recognized the enormous financial benefits that can be achieved from network optimization projects, but recognized these results are only achieved by a substantial amount of effort first in terms of development of the data models used in the optimization, and more importantly the effort associated with making the operational changes that will deliver the savings.

But clear, up-front ROI quantification at some level is difficult, even if the potential result is large. Most other supply chain software applications have a more defined scope, and set of inputs and outputs, making cost justification a comparatively fair straight forward calculation. But with Network Planning tools, what the output will be, and resulting benefits, is hard to estimate upfront.

More importantly, while all software, of course, is dependent on the success of the implementation and changes to process and people’s behavior, Supply Chain Network Planning software is a unique case. All the tools can do is make recommendations. Whether a company embraces those recommendations, and has the discipline, structure and vision to implement those strategies that make sense for its situation is a totally different question. These tools could recommend changes to long term, and mid-term supply chain networks that would lead to tens of millions in savings, but to move from potential to realized gains, they obviously require action.

Example: Show the Value

As always, companies are often reluctant to publicly identify specific savings levels. Supply Chain Digest has spoken to a number of companies privately that have achieved tens of millions in savings from use of the tools and resulting network changes. Following are some examples of companies that have shared their results at various industry events:

- A few years ago, a logistics executive from a grocer, A&P, said that as a result of analyzing the company’s network using one of these tools and enacting the recommended changes, it was able to reduce total delivered costs per case by almost 50 cents per case, a significant savings.
- Tyco Health Care was able to reduce total logistics costs by 14% by using a Network Planning tool to help it understand how it could integrate distribution networks between two operating divisions.
- While the savings can be substantial, as in these examples, in the end adoption of the tools is really less about direct ROI calculations than it is about a supply chain operating philosophy that recognizes the need for continuous improvement and objective decision support for determining strategic and tactical plans.

Will companies that embrace and execute this vision achieve substantial return from their investment in technology and time? It only makes sense, if the recommendations are largely adopted.

Network Planning Tools Can Identify Substantial Savings Opportunities

In this real example, the difference in total supply chain costs between different manufacturing plants shows costs swings in the millions of dollars. (Source: LogicTools).
Case Studies: Moving to Continuous Network Optimization

The perplexing thing is that the barrier to this type of approach is primarily a people-oriented one, meaning companies, in an effort to keep costs and head count low, just won’t staff even one person to take this role on full-time.

We believe the ROI from developing a single individual or small team, depending on company needs, would be enormous, and clearly demonstrable, for hundreds of companies. Yet, staffing support remains the largest obstacle to this type of program.

There are actually two types of approaches to continuous Network Planning.

- Using Network Planning tools on a consistent basis (quarterly, or even monthly) to re-evaluate the network, make adjustments in tactical plans, and answer specific questions that arise on an integrated supply chain basis.

- Developing a “shared service” network strategy environment in complex, multi-divisional companies to help individual business units or geographies improve their supply chain decisions.

Below, we offer a short case study example of each type, the first from PepsiCo, the second from Tyco Health Care.

Pepsi’s Continuous Network Optimization is Best-in-Class

Supply Chain Digest believes that PepsiCo is the most advanced user of Network Optimization tools and strategies, given its approach to continuous strategic and tactical planning and the scope of the problems it is solving.

If there is a better story out there, we haven’t heard it.

PepsiCo involves multiple, well-known businesses and brands, including the flagship soft drinks, plus Frito-Lay, Tropicana, Quaker Oats, Gatorade, and more. It has a vastly complex supply chain in the U.S. alone, driven by the nature of its business, with dozens of manufacturing sites, literally hundreds of distribution points, and highly seasonal elements of some of its business.

For many years, it has operated a dedicated group that continuously optimizes supply chain network decisions at three levels:

- Long term: plant configurations and manufacturing technology/automation

- Medium term: capacity planning, capital planning and master planning

- Short term: finished goods network, raw materials network

A team of about 6 people, using i2’s Supply Chain Strategist Network Planning product, consistently maintains and updates the current network models, supporting the business in developing plans for the supply chain over all three of these time horizons. The key to the effort, Pepsi says, is building a flexible model. In Pepsi’s case, that means including in the model:

- Fixed, variable, closing, and step costs throughout the supply chain

- Co-packers, tiered pricing, volume effects

- Multiple processes within facilities

- Inventory at facilities and in-transit between facilities

- Customer requirements

- Lead times and service levels throughout the supply chain

This gives Pepsi the capability to model and optimize the entire supply chain and also the flexibility to model discrete elements for more focused decisions.

While the tool is essential, the results depend on development of disciplined processes for making the decisions and on “Strategy Managers” within the team. These Strategy Managers own the process and work cooperatively with the businesses and are ultimately responsible for “selling” and implementing supply chain network decisions. These Strategy Managers are supported by “Network Modelers,” who maintain the models and crunch the numbers (see illustration nearby).

Few companies have empowered individuals at this level to drive strategic network decisions. And almost no other company has Pepsi’s capability to dynamically adjust their supply networks in the short term to optimize performance.

The company estimates it achieves a 10-20% improvement in operational results from this approach in its strategic decision making, 5-10% in tactical planning results, and a little less than 5% in shorter term finished goods and raw materials network decisions.

This is a huge advantage and drives tens of millions of dollars or more to the bottom line.

Tyco Health Care: Delivering Global Value through a Supply Chain Network Planning Services Group

Tyco Health Care is a $9 billion dollar unit of Tyco Inc., and is itself comprised of a number of product-oriented business units and international geographies. For several years, a small team (generally about three people, sometimes augmented with an outside consultant if the level of workers gets very large) has been used to provide a “shared service” within the division to help the many business entities optimize supply chain and logistics decisions.

The different businesses bring their network questions to the group, which has the supply chain network strategy expertise and network planning software (i2) required to work with the businesses to make strategic recommendations, based on the objective insight generated by the software. Today, given the high level of demand from these groups, the efforts are generally

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**Case Studies: Moving to Continuous Network Optimization**

reactive to specific requests from the businesses. A typical project takes about six months, and as successes have been achieved, demand for the group’s services has continued to expand.

There have been many successes from the group’s efforts. In one example, one of the U.S. divisions was expected to exceed its current distribution capacity in the northeast. Contrary to some of the initial expectations, the i2 tool indicated that the best decision was to move distribution to a shared-services DC with another product group in Illinois.

This decision resulted in total logistics savings of 14% versus the initially preferred decision, while improving customer service/delivery.

In another case, the group helped guide a total revamp of the distribution network for Tyco’s business in the Spain-Portugal region, again leading to significant improvements in cost and service.

A manager in the group noted that the objective nature of the analysis is one of the real keys to helping make decisions. “The data doesn’t lie,” she said. “We believe having this capability gives us a competitive advantage.”

Tyco’s case is a bit of a hybrid approach because even though it has a dedicated team and consistent use of the tool, its projects tend to be “one time” type efforts across multiple business units. This approach makes sense if a company has multiple businesses with unique supply chains.

**Summary**

Both of these case examples illustrate the trend and the benefits of a more continuous approach to network optimization.

Today, taking this level of continuous planning delivers true competitive advantage. We believe that as more companies embrace the approach, which is the clear trend, those that don’t will be increasingly at risk in terms of supply chain performance. Supply Chain Digest suggests starting small, perhaps with a single person, and expanding from there as opportunities and results dictate. It seems clear that for most companies, the cost of a single manager/analyst would be quickly returned from improved decisions and insight into the supply chain.

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**Pepsi’s Network Strategy Roles**

<table>
<thead>
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<th>STRATEGY MANAGER</th>
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<tr>
<td>- Identifies the needs of the business:</td>
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<tr>
<td>- Capacity</td>
</tr>
<tr>
<td>- Productivity</td>
</tr>
<tr>
<td>- Flexibility</td>
</tr>
<tr>
<td>- Other</td>
</tr>
<tr>
<td>- Has business-specific expertise</td>
</tr>
<tr>
<td>- Owns the business strategy</td>
</tr>
<tr>
<td>- Formulates the network question(s) (what-ifs)</td>
</tr>
<tr>
<td>- Provides domain knowledge and constraints to the modeler:</td>
</tr>
<tr>
<td>- Capital</td>
</tr>
<tr>
<td>- Operational</td>
</tr>
<tr>
<td>- Works the strategy:</td>
</tr>
<tr>
<td>- Business partnership</td>
</tr>
<tr>
<td>- Socialization</td>
</tr>
<tr>
<td>- CAPEX</td>
</tr>
<tr>
<td>- Labor Implications</td>
</tr>
<tr>
<td>- Establishes and sells the business strategy</td>
</tr>
<tr>
<td>- Gets the organization to commit to a strategy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NETWORK PLANNER (MODELER)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Maintains Network Models and Core Data</td>
</tr>
<tr>
<td>- Provides direction on financial and operational data requirements</td>
</tr>
<tr>
<td>- Works with Strategy Manager in formulating the network questions</td>
</tr>
<tr>
<td>- Crunches the numbers for the network solution leveraging sophisticated network planning tool (SCS)</td>
</tr>
<tr>
<td>- Expertise in network design and analysis</td>
</tr>
<tr>
<td>- Strong mathematical background:</td>
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<tr>
<td>- Able to formulate complex questions into mathematical statements for solution</td>
</tr>
<tr>
<td>- Advanced degree OR/IE</td>
</tr>
<tr>
<td>- Provides a “holistic” view of the impact of a solution on the entire network</td>
</tr>
<tr>
<td>- Can flex from one network problem to another</td>
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</tbody>
</table>
Network Planning and Optimization Resources

Find the Network Planning-related information and tools you need.
Available for download at www.scdigest.com/letter

Partial list of resources available:

On-Demand Videos and Video casts
- Network Planning and Optimization Overview

More Network Planning and Optimization and Video casts coming soon.

Tools
- Example Network Planning RFI
- Graphic: Example Total Supply Chain Cost Analysis
- How to Select a Network Planning Consultant

Large selection of material, including the featured material from i2 and LogicTools
- Building a Flexible Supply Chain Network
- i2 Supply Chain Strategist Overview
- Selecting a Consultant for Network Planning Tips for Ensuring the Right Fit
- Cooper Tire & Rubber Case Study
- Shaw’s Supermarket Case Study
- A Holistic Approach to Supply Chain Transformations
- Logic Tools Complements SAP

Coming in the next Supply Chain Digest Letter…..

Labor Management Systems for Logistics

In just a few years, Labor Management has gone from being a relatively unknown technique, used by just a small number of companies largely in the grocery and food service industries, to become one of the hottest areas for companies looking to improve their logistics performance.

In the next issue of The Supply Chain Digest Letter, we’ll take a steep dive into this topic, exploring key trends, keys to implementation success, how to really drive the value from Labor Management, and more.

If you or a colleague is interested in the potential for Labor Management in your logistics chain, you won’t want to miss this issue.

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Upcoming issues of The Supply Chain Digest Newsletter:

- Labor Management Systems
- Sortation Systems in Distribution
- Sales & Operations Planning
- Warehouse Management Systems

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