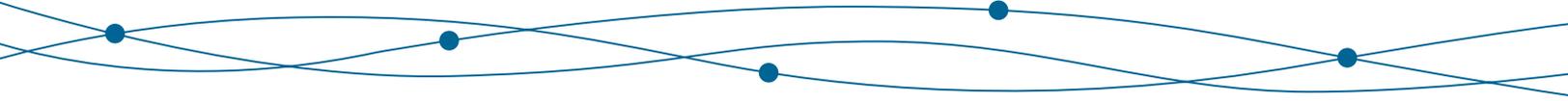


Pop-Up Supply Chains: Leveraging Network Assets for Dynamic Distribution

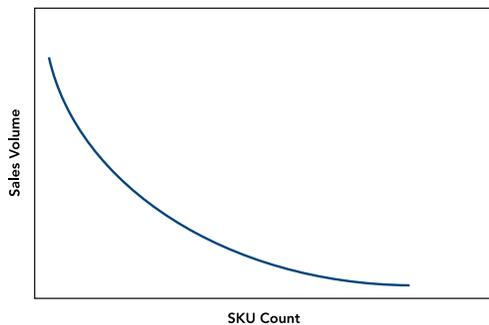


Contents

- ② Introduction
- ③ Inflection Points
 - Distribution Center Locations
 - Manufacturing Plant Locations
- ⑥ What is a Pop-Up Supply Chain?
 - Temporary DCs?
 - Leveraging All Potential Distribution Points
 - Suppliers
 - Consolidators
 - Stores
- ⑩ Conclusion

Introduction

A 'perfect storm' of conditions in recent years has created new and greater pressures on supply chains than ever before. Laying the foundation was the rise of e-commerce and the Internet in the late 1990s; consumers have become more educated and more demanding than ever before. This demand manifested itself in multiple ways. First, was *SKU proliferation*. The ability to research and ultimately the ability to customize dramatically increased the volume of SKUs supply chains had to manage. Retailers introduced 'endless aisles' allowing consumers to buy more products online or at a kiosk than a retailer could possibly stock.

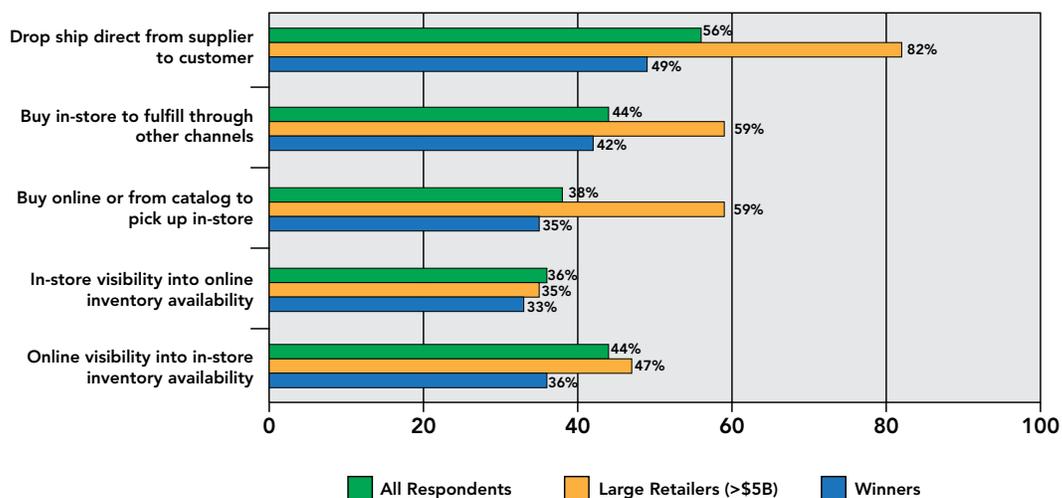


The more recent phenomenon of *channel proliferation* is a result of the Internet changing the way consumers prefer to do business. Retail and direct channels no longer simply co-exist. They now intertwine. This juxtaposition is more than just buying online and returning at the store. A customer's store buying habits should be reflected in how he/she is treated and marketed to online.

Early on, this new complexity could be addressed with brute force—extra inventory, extra labor and expedited transportation. However, the surge in oil prices that started with Katrina and pushed higher with the rise of the BRIC economies ratcheted up financial pressure. Ultimately, the slowdown of western economies is forcing the hands of many supply chain operators.

How do companies today best cope with these accumulated pressures? An efficient supply chain is no longer enough. Supply chains need to be nimble and agile. Trading partners need to do more than simply supply or ship. A fulfillment point may 'pop-up' quickly, serve a new purpose and then fade back to its original state. It takes organizational flexibility and supporting technology to help create this kind of network. This paper will describe in more detail how we got here and what a 'pop-up' supply chain looks like to enable companies to thrive in this environment.

Cross-Channel Activities



RSR Research, 2008

Inflection Points

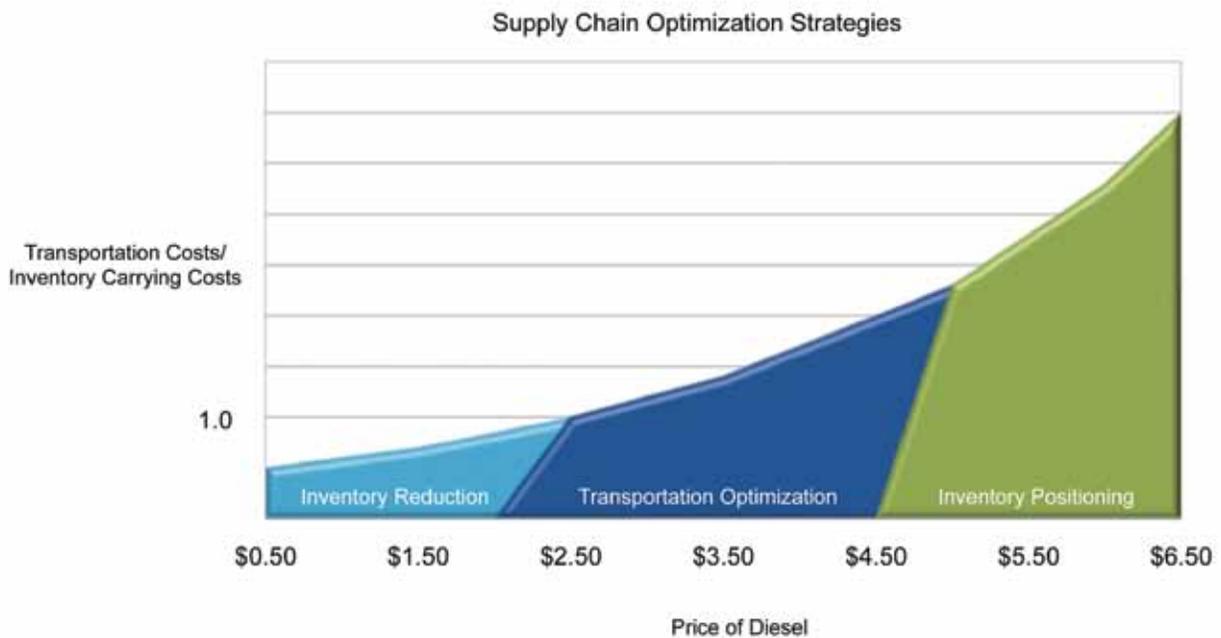
While there are many conditions that led to this state, it usually takes one that is easily measurable to help define a tipping point. For our purposes, the metric is directly related to the cost of oil. In particular, it is the ratio of transportation cost (essentially tied to fuel) to that of carrying inventory (largely a factor of interest rates). In our study, there are actually two inflection points.

When oil is plentiful and inexpensive, it is ideal to make goods as cheaply as possible (i.e. off-shore) and store them centrally to keep as low an overall inventory level as required to maintain good customer service. Air freight and expedited shipping (and therefore high customer service levels) are relatively low cost, so supply chains are designed and software is configured to minimize inventory levels.

While the inflection point differs by industry and product mix, most companies have crossed the threshold. For many, this was between \$1.50-2.00 a gallon for diesel fuel. Suddenly, no matter what your credit rating (and therefore carrying costs), transportation became simply too expensive. At this point, the idea of using lower cost shipping methods

(and therefore greater lead times) is tolerable because the cost of higher safety stock levels is still less than the freight expense. Historically, companies with smaller freight spends could not justify implementing a TMS. Even though these businesses may not have grown, their freight spend did, driving growth in the adoption of transportation software. Similarly, rules around inventory planning were adjusted to provide for fewer, larger shipments.

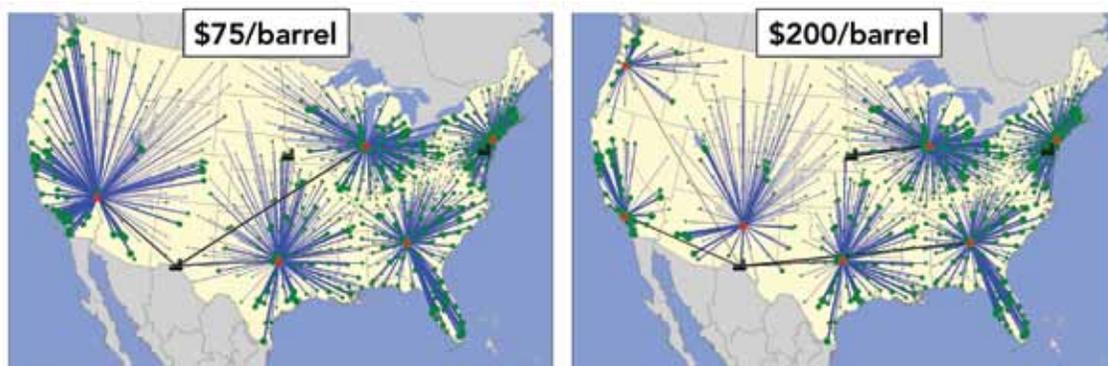
Unfortunately, fuel prices have kept climbing. We are quickly reaching the next inflection point—one that was always thought to be in the distant future. When diesel reaches a certain price level (again it varies by industry, though \$5/gallon seems to be a fair consensus) the cost equation changes yet again. Even high inventory levels aren't enough to offset the cost of transportation. For the first time, the cost of building and operating new distribution centers, along with the inventory necessary to stock them, is less than the freight cost to sustain shipping from these larger, more centralized distribution centers.



Distribution Center Locations

As described above, once this inflection point hits, the math changes. In a study performed by ILOG (now IBM) in 2008, a consumer goods manufacturer's network was analyzed. The current network design, with five distribution centers (in New York, Chicago, Atlanta, Dallas and Albuquerque), supports the business very well when oil is \$75/barrel. The western half of the country can be serviced from a single distribution center in New Mexico. Even though the distances are great, the labor, real estate and inventory savings

of a single facility offset the cost of shipping. However, if oil prices rise, the network becomes sub-optimal. Supporting western customers from a single warehouse, with shipments in excess of 1,000 miles, is no longer practical. Using network optimization tools, this study determined that the Albuquerque warehouse should be replaced with three new warehouses—in Los Angeles, Portland and a scaled-down operation in Albuquerque.



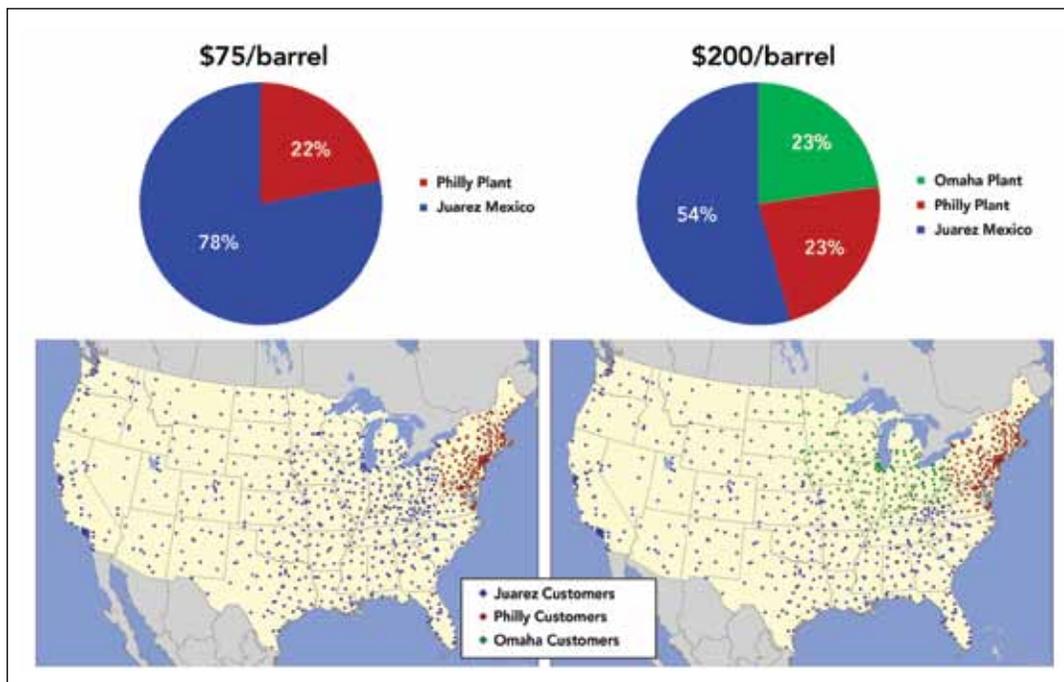
Network optimization tools are used to determine optimal locations for warehouses.

Manufacturing Plant Locations

Of course, the impact on facility location is on more than just distribution. Depending on the nature of the business, manufacturing is also affected. For the last 10+ years, manufacturing operations have been leaving the U.S. in droves. Low cost labor was (and is) in ample supply in many parts of the world. However, four factors are now making U.S. companies reconsider. First is simple economics. With so many manufacturing jobs moving to China and other parts of the world, the standard of living, and hence the cost of labor, is naturally going to rise. To continue at current cost levels, operations have to move further and further inland, where logistics infrastructure is lacking (increasing lead time and variability). Second, the weak U.S. dollar means that the cost benefit of

producing overseas is somewhat mitigated. Third, recent quality scares from products manufactured in China are giving pause and giving marketing benefit to the classic 'Made in the USA' label. Finally, and most importantly are transportation costs—for all of the same reasons distribution networks have to be evaluated.

IBM also studied this manufacturer's production operations. This company had three potential locations for production—Juarez, Mexico (the lowest cost/unit), Philadelphia (the highest cost/unit) and Omaha, Nebraska. At \$75/barrel, the Juarez plant would supply more than 75% of the customers. At \$200/barrel, Omaha comes into play to help support much of the upper Midwest (nearly 25% of all customers).



Manufacturing operations can be analyzed to determine optimal locations in an effort to reduce costs.

What is a Pop-Up Supply Chain?

Moving warehouses and factories is a great long-term solution, but it requires significant up-front capital, is not always practical and is difficult to derive near-term savings. This is why Pop-Up Supply Chains can really benefit companies. The basic premise of the Pop-Up Supply

Temporary DCs?

Many retailers are already practitioners of Pop-Up Supply Chain philosophies. During the holiday season, they would like to have a presence in some areas where they do not have a permanent store. The solution? Temporary kiosks at local shopping centers or malls that 'pop-up' in November and disappear by January. This way, they have the benefit of a storefront, without the initial investment or year-round expense. This philosophy can and should be extended to distribution centers.

Given the high cost of transportation, there are certain areas of the country that could benefit from a regional distribution center but don't warrant the investment on a full-time basis. An example is seasonal destinations. Parts of the upper peninsula of Michigan or Maine have a huge influx of tourists during the summer. Consumer demand for groceries, drug stores and sporting goods spike during summer months. However, during frigid winters, the population shrinks and demand subsides. Ski resort areas of Colorado, Utah and other states experience similar curves around the winter season. Retailers and their suppliers could pop-up smaller distribution facilities on a 3-4 month schedule to benefit from the lower net transportation costs but without the major investment to build a facility that may go unused the rest of the year. This feat could be accomplished with an organization's own logistics department (through short-term leases or the use of a public warehouse) or through innovative arrangements with a third party logistics provider (3PL).

Chain is to leverage all available assets in a network to dynamically flex the nodes available for distribution as demands change throughout the course of the year. Let's look at a few examples:

Supporting this strategy requires logistics flexibility along with system support. Certainly, implementing a full warehouse management system (WMS) isn't practical for a facility with a four-month life expectancy, nor does it make sense for what is likely to be a very small operation. On the other hand, manual, paper-based environments result in holes in visibility and often times poor operational performance. To solve this, 'extended enterprise management' systems can offer light-weight warehousing capabilities over the Internet. Functions such as receiving, packing and shipping are all that are really needed to gain visibility and assure store service levels. These virtual WMS-lite systems can be rolled out in days and offer a good, hybrid solution for this need.



Example of a temporary kiosk at a local shopping center or mall that 'pop-up' in November and disappear by January.

Leveraging All Potential Distribution Points

While running a temporary distribution center is the most radical way of flexing a supply chain, it is not the only way. Most companies will be surprised if they ask

Suppliers

Most companies work with their suppliers in a traditional way—purchasing (or manufacturing) and shipping into distribution centers to build a base of inventory from which to fulfill demand. However, other companies have begun working with their suppliers in a more creative way. One retail example is **Nordstrom.com**. The Nordstrom web site carries a far greater assortment of shoes than they actually carry in their Iowa distribution center. This is important as a means of providing the top-notch quality, selection and customer service that Nordstrom is known for. To accomplish this ‘endless aisle’ of selection, they have crafted partnerships with many of their suppliers. When an order for a pair of **Keds** is placed, it will actually seamlessly transfer to **Stride-Rite**, who will fill this order from their distribution center and ship it directly to the consumer’s house, complete with a Nordstrom packing list, so it would appear as if it came from Nordstrom directly.



This kind of arrangement benefits both Nordstrom and Stride-Rite. Nordstrom can offer an incredibly diverse selection of products without the investment in inventory, transportation or distribution needed if they carried all of them in-house. For Stride-Rite, they benefit from greater exposure of more products and better visibility to actual customer demand.

For manufacturers, a similar arrangement can be made with factories overseas producing their goods. In 2008, **Under Armour** launched a massive roll-out of Trainer shoes (‘the new prototype’) simultaneously across their retail customers. This involved distributing 500,000 pairs

of shoes in time for a hard launch. Rather than pushing this massive quantity of footwear through their supply chain (which would have been a huge strain), Under Armour coordinated with their factories to ship directly from China to retailer distribution centers.

Much like with temporary distribution centers, a strong technology foundation is necessary to support these kinds of models. In the case of the retailer/supplier relationship, advanced order management systems need to be able to recognize what product is available in-house, what products can be offered by suppliers and accurate lead-time information to provide reliable promise dates to the customer. Furthermore, while some suppliers will have warehouse management systems that can support shipping on behalf of the retailer, not all will. Some suppliers are smaller, ‘mom-and-pop’ operations that have relatively unsophisticated systems. For these suppliers, a ‘virtual WMS’, much like the one described above, can help provide the tools necessary to support this business model.

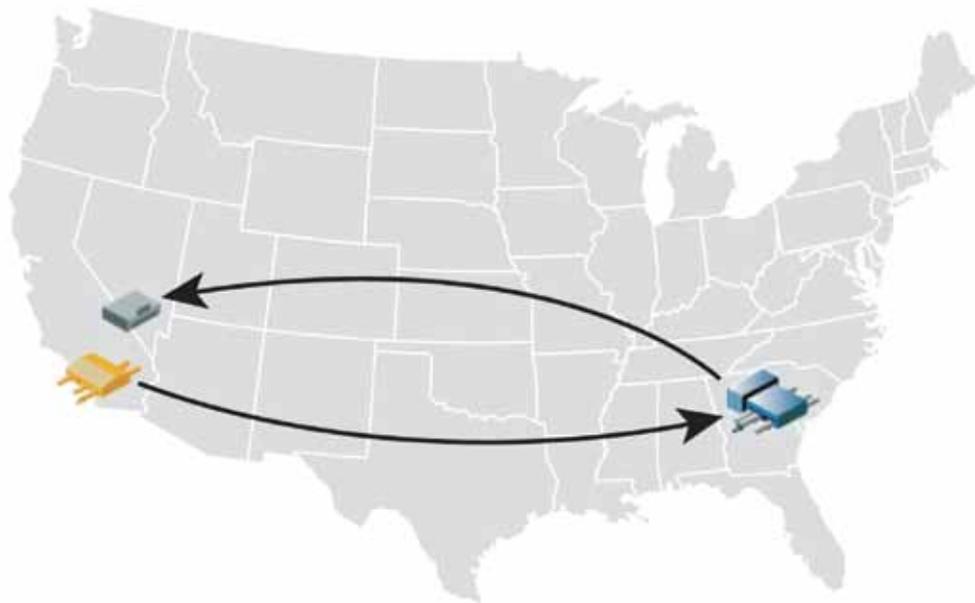
In the case of Under Armour, or any manufacturer working with overseas factories, the same ‘virtual WMS’ is needed. Of course, the requirements for this system are a little different. As a supplier that is either owned or under contract with the manufacturer, there is an opportunity to get greater visibility into the manufacturing process. Even more importantly, quality assurance is a must, as the goods are shipping straight from an off-shore factory to a customer. So inspection techniques and documentation are a must. Finally, the system must be translated into Chinese and be able to work over sometimes spotty Internet connections.



Consolidators

With the prevalence of off-shore manufacturing, particularly in Asia, almost every manufacturer and distributor imports product through the west coast ports. To that end, most of these companies work with some sort of 3PL or freight forwarder to manage their product into, and often times out of, the ports. For companies with their primary distribution centers in the Midwest or on the east coast, it is common to ship product into Los Angeles and then east across the country, only to send a large portion right back out west to customers or stores in the southwest or the northwest. In fact, for one footwear manufacturer, this represents 27% of total volume! Think about the repercussions of this approach: the freight costs, the labor, the unnecessary warehouse space. Not to mention the impact on lead time to the customer.

In the spirit of pop-up supply chains, 3PLs can be used to help this. While they are handling the goods in the port, the 3PL should be able to support direct shipping (when applicable) to customers and stores on the west coast, thus bypassing two major legs and a cost center in the supply chain. Recently developed 'flow management' systems help companies with this approach. These systems factor in demand forecasts and orders, inventory positions and service level strategies to postpone the inventory deployment decision until as late as possible. Based on these factors, instructions can be given to the 3PL to divert part of the shipment and direct it to regional customers.



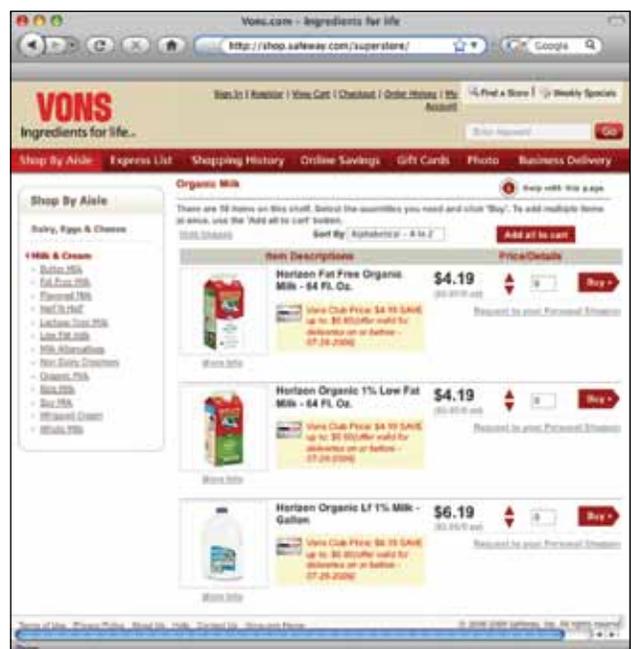
For companies with primary distribution centers in the Midwest or on the east coast, it is common to ship product into Los Angeles and then east across the country, only to send a large portion back out west to customers or stores in the southwest or northwest.

Stores

Lastly, retailers have one additional way to meet customer demand—the store. Multi-channel commerce evolution dictates that stores and web channels need to intermix. The customer is only one customer, after all, not an instance of a store customer and a separate instance of a web customer. That being the case, leveraging the store as a fulfillment node becomes more attractive. Retailers have begun offering a wide variety of options such as buy online, pick up at the store or buy online, return to the store. A few retailers are also beginning to deploy a third method—buy online, ship from store. For some regions and product mix, this simply makes sense. Grocers such as **Safeway** and **Tesco** now offer the ability to shop online and have groceries delivered to your home. These groceries don't come from a warehouse, they are picked and delivered from a nearby store. Other retailers starting to do this include **Bed Bath and Beyond** and **Johnston and Murphy**. This represents a great way to leverage a common pool of inventory to maximize profits and minimize markdowns. Additionally, back-of-store labor tends to be less costly than warehouse order pickers. While their efficiency isn't as high, the model still works rather well.

There are two primary technology considerations to support a store-fulfillment model. The first is store inventory. Many retailers simply do not have accurate inventory levels in the store (hence the frequent overnight and weekend physical counts). Without dependable

inventory levels, it is impossible to know if product is even available in the store. Once accurate levels are attained, a distributed order management system is needed to determine the optimal fulfillment center to ship an order from. Factors that should be considered in this decision include the obvious (inventory availability and proximity) but also the more sophisticated (transportation costs, inventory segmentation across channels and forecasted demand for the store).



Retailers have begun offering a wide variety of options such as buy online, pick up at the store; buy online, return to the store; and buy online, ship from store.

Conclusion

Today's environment offers greater challenges to supply chain professionals than ever before. It is fair to say that if we haven't yet reached the second inflection point, then without major changes in energy policy and technology we probably will in the next few years. Large-scale, long-term network optimization projects are the most obvious answers to meeting this inflection point.

However, pop-up supply chain concepts can be applied to many networks right away for immediate effect. More importantly, the future network structure will likely have to be re-evaluated once again, as macro-economic and technology conditions change. The pop-up supply chain can help companies navigate the difficult transition periods between these transformations.

Manhattan Associates makes commerce-ready supply chains that bring all points of commerce together so you're ready to sell and ready to execute. Across the store, through your network or from your fulfillment center, we design, build and deliver market-leading solutions that support both top-line growth and bottom-line profitability. By converging front-end sales with back-end supply chain execution, our software, platform technology and unmatched experience help our customers get commerce ready—and ready to reap the rewards of the omni-channel marketplace.

