



White Paper

# Product Flow Path Design – Because One Size Doesn't Fit All

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## Why Not One Size for All?

Imagine your business with only one product purchased from just one supplier and distributed to a single customer who orders the same quantity on a regular basis. Perhaps this was the case during the infancy of your organization. Perhaps it's simply a fantasy. Assuredly, your business is nothing like that now. If you are like most distribution intensive businesses, you have multiple products in a variety of shapes and sizes sourced from points across the globe. And, you are likely to be distributing through multiple sales channels each with customers demanding ever higher levels of service. Clearly, a one size fits all approach to your Distribution Network Strategy isn't the optimal path forward for your business.

### Why Not One Size for All?

We recently benchmarked a number of U.S. retailers, comparing their network design to inventory performance. Our analysis indicates that companies within the same retail category have similar inventory performance. This is especially so when retailers employ similar network designs as their competitors. It's certainly not surprising. Each company within a given category must meet the same customer expectations for inventory availability. So, a "me too" approach to network design is logical. But, it's not an approach that leads to breakout performance or competitive advantage for any distribution intensive organization.

Company	Inventory Turns	Distribution Network
Sporting Goods A	2.0	1 DC
Sporting Goods B	3.5	2 DCs
Sporting Goods C	2.7	4 RDCs
Electronics A	6.9	8 DCs and 13 satellite facilities
Electronics B	4.7	14 RDCs
Auto Parts A	1.6	8 RDCs, 16 Local DCs, 1 DC for Slow Movers
Auto Parts B	1.6	8 RDCs
Auto Parts C	1.6	6 RDCs, 1 Smaller DC for large non-conveyables
Office Supplies A	6.0	4 DCs & 30 Fulfillment Centers
Office Supplies B	7.3	10 Cross-dock facilities
Books A	2.6	3 DCs
Books B	2.1	5 US DCs
Home Supplies A	3.9	8 RDCs
Home Supplies B	4.0	16 Import DCs and multiple business specific DCs

Source: Fortna Analysis of Most 2006 Company 10Ks - Courtesy of Edgar Online  
 Note: Inventory Turns reflect global Cost of Revenue and Inventory

Of more interest in our benchmarking analysis is the relationship between inventory performance and the sophistication of the network design. Further, there tends to be a correlation between organizational maturity and a more tailored approach to Product Flow Path Design. Larger, more mature organizations have the economies of scale to employ more innovative methods of flowing product from suppliers to customers. Those that excel take advantage of their scale. But, you don't have to be a large organization to employ innovative methods. In fact, it may be easier for smaller, more nimble businesses to tailor their line of attack in servicing customers. Regardless of size, remember that it's not simply a matter of shipping direct or through a DC. Multiple product flow path alternatives can and should be considered.

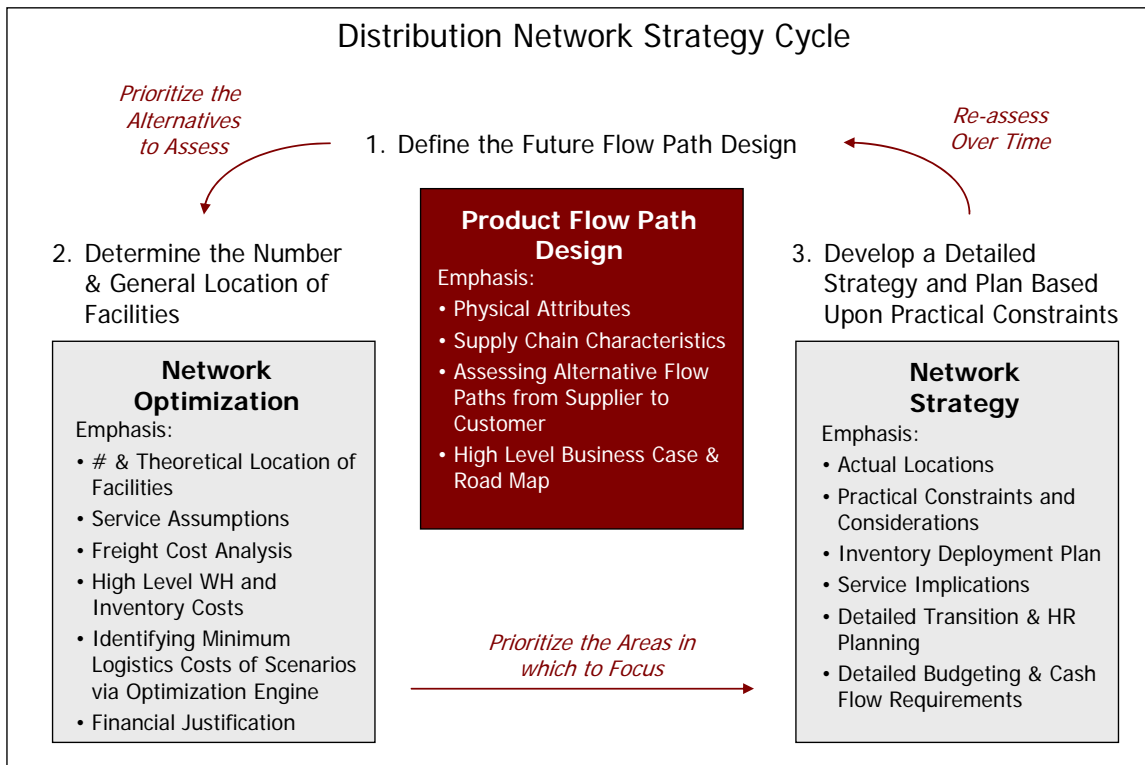
## Start with Product Flow Path Design

### Start with Product Flow Path Design

Too often, organizations put the proverbial “cart before the horse” when designing their distribution network. It tends to be facility focused rather than path and product focused. We have all learned that the goal is to get the right product to the right place at the right time in the right quantity. How many facilities you have and where you place them on the map are a “facility focused” means of supporting this goal. But, you cannot truly determine the optimal number and location of facilities unless you first step back and align the many flow path alternatives available to you with the unique characteristics of your product offerings. This alignment process is called Product Flow Path Design.

### The Distribution Network Strategy Cycle

Product Flow Path Design defines the most cost efficient and service effective paths by which to flow products from suppliers to customers. It also provides a strategy, a business case and prioritized road map for moving forward. It can be considered as the critical link in the Distribution Network Strategy Cycle.



To execute the Product Flow Path Design, the next question is often “how many facilities do you need and where should they be?” Ideally, this is done through a network optimization analysis. Network optimization takes a deep dive specifically into the estimated freight costs associated with alternative distribution facility locations. Most often, a commercial software tool is used that has an optimization algorithm that essentially functions like a linear programming model to determine the minimum cost of alternative locations and product flows. It’s a highly data intensive and theoretical process requiring trained analysts to use the tool. But, the most important input to this process is identifying the alternative scenarios and flow paths in which to analyze. Rarely do these projects have sufficient time or budget to evaluate all the potential flow path scenarios or product segment permutations. So, a Product Flow Path Design avoids sub-optimizing your network optimization study by providing a prioritized set of alternatives in which to evaluate.

## Strategic Questions Addressed

The resulting network optimization analysis following Product Flow Path Design is valuable input to the broader and more comprehensive requirements of a Distribution Network Strategy. A Distribution Network Strategy includes inventory deployment planning, service capability definition across channels, systems planning, and detailed financial budgeting. It is also based on practical constraints and considerations such as the availability of resources and logistics partners to execute and maintain the strategy.

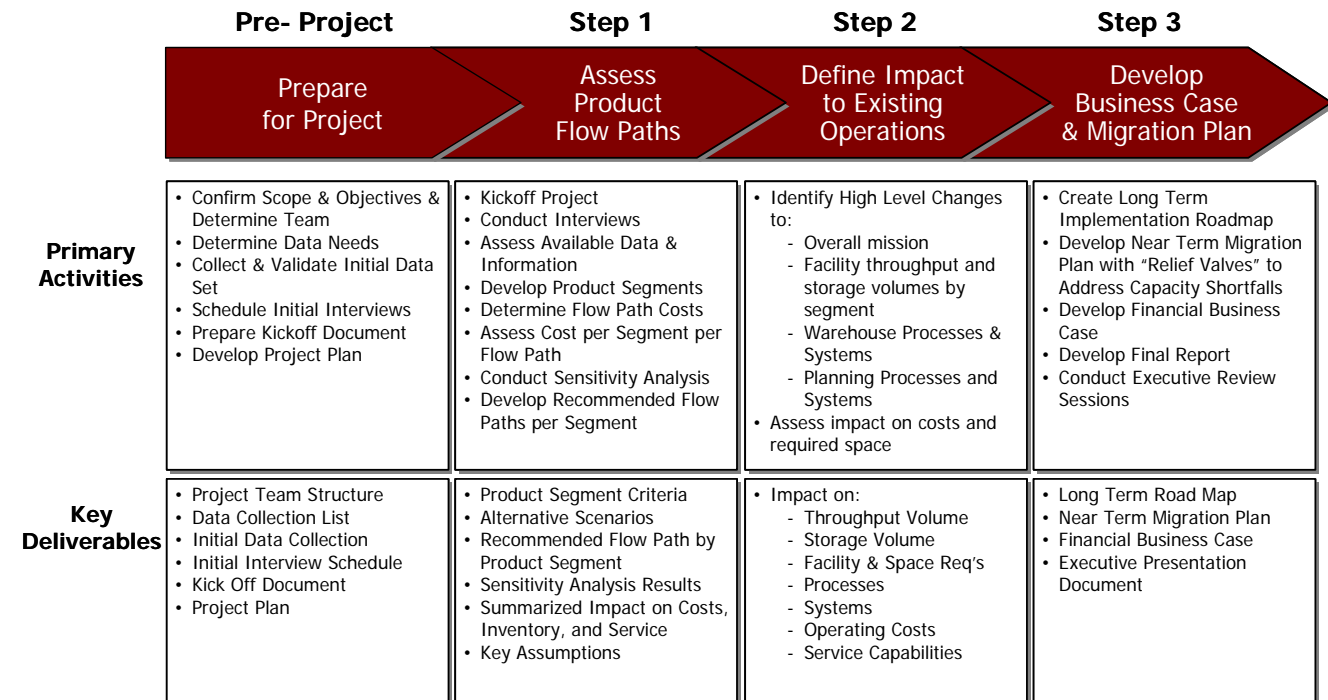
Because all businesses change over time, the network strategy needs to be periodically re-evaluated. This need creates a loop back to Product Flow Path Design.

## Strategic Questions Addressed

The intent of a Product Flow Path Design is to answer three strategic questions.

1. Product Flow Path: What are the most effective and efficient methods (balancing cost and service) to flow unique product groupings from suppliers to customers or stores?
2. Supply Chain Operations: What is the impact of the recommended product flow paths on existing operations (near and longer term)?
3. Business Case/Migration Plan: What is the supporting business case and migration plan to support the recommended changes?

Recommended tasks and deliverables from this effort are outlined in the chart below.



## Alternative Flow Paths

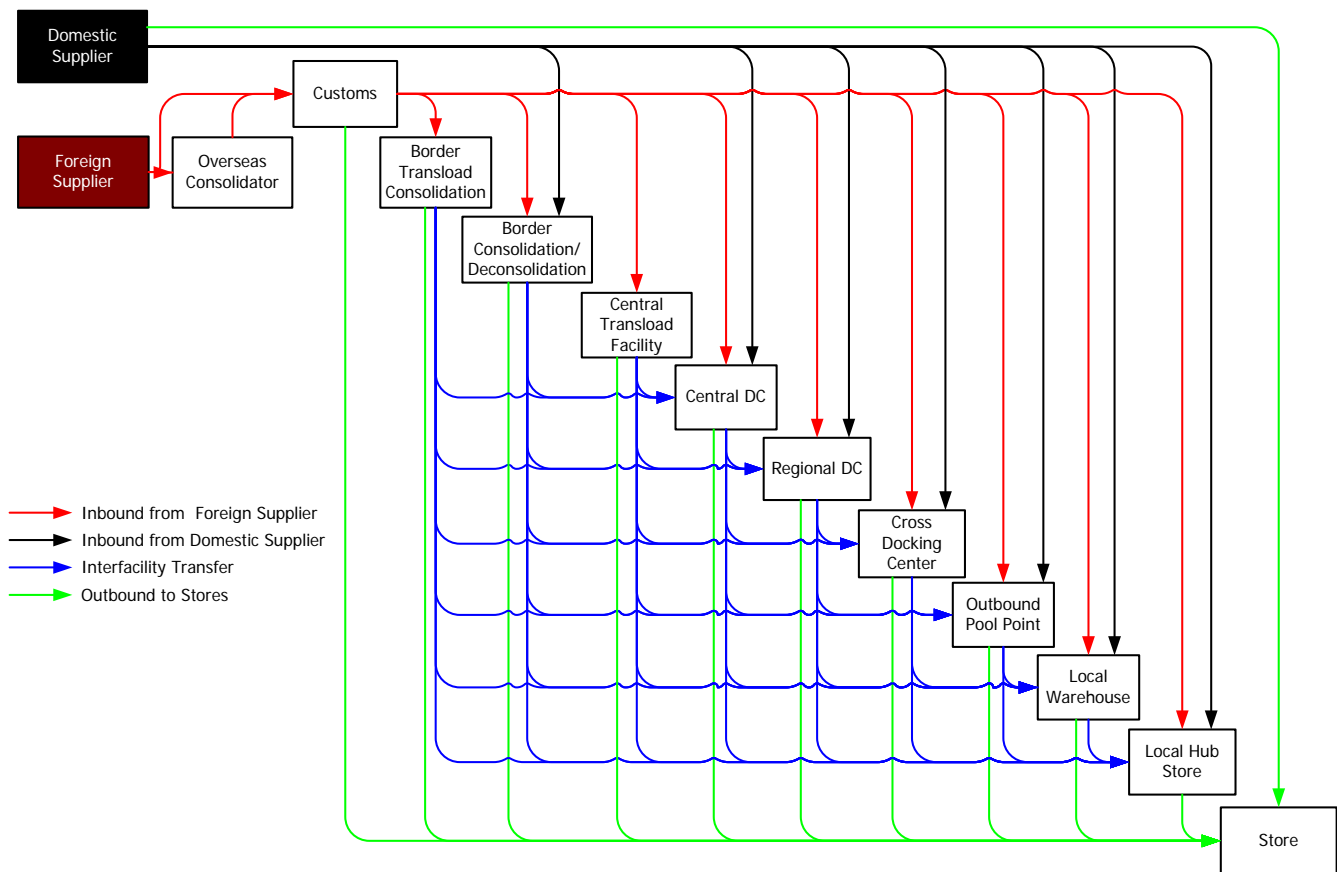
### Evaluating and Trimming Flow Path Alternatives

To gain competitive advantage, we advocate a highly tailored approach to product flow path design. But, it's not economically practical to implement and maintain too many unique paths. Some consolidation is necessary, which leads to a more manageable set of alternatives to evaluate. Further, there's no sense in "boiling the ocean" in assessing every alternative imaginable. The more sensible approach is to:

- Apply deductive reasoning in developing a set of hypotheses for the future supply chain;
- Allow business priorities to dictate where to focus your analysis (e.g. inbound vs. outbound alternatives);
- Create a set of logical product segments by which to assess alternative flow paths within the hypotheses;
- Develop and use a financial model to compare the impact and sensitivity of each hypothesis vs. a "do nothing," baseline alternative.

The resulting financial comparison will provide the means to prioritize efforts and investments moving forward.

The diagram below outlines many of the potential alternative flow paths available to distribution intensive organizations.



## "Rule of Thumb" Considerations

Obviously, not all of the alternatives depicted will make sense for every organization. Product attributes such as size, volume, value, source, and destination largely dictate how a product should flow through the supply chain. As such, suggested "rules of thumb" on when to consider each flow path alternative is outlined in the following table.

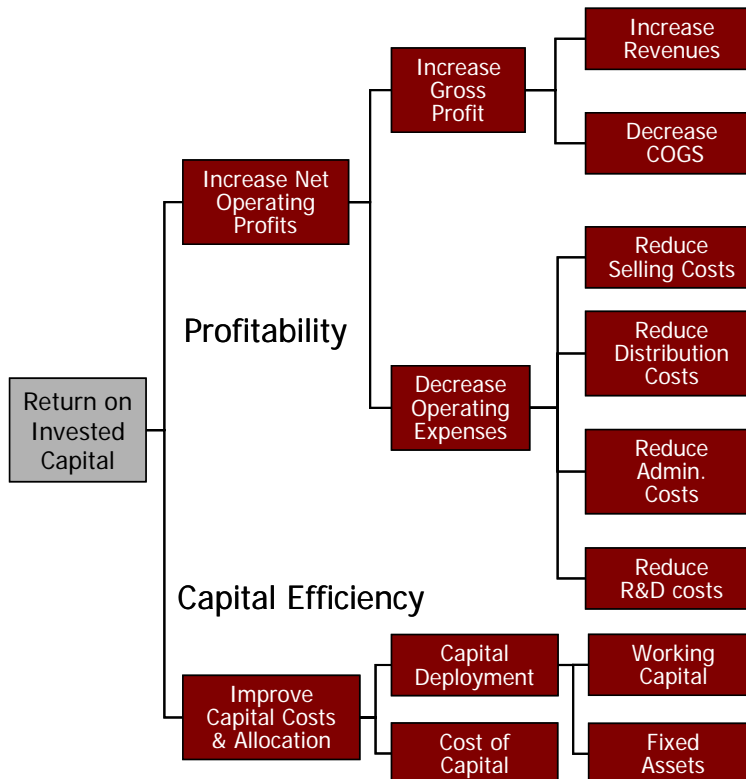
Flow Path Alternative	"Rule of Thumb" Considerations
Ship Direct from Domestic Supplier	<ul style="list-style-type: none"> <li>▪ Low margin, high volume product</li> <li>▪ Locally sourced product (e.g. perishables)</li> <li>▪ Product with highly variable demand</li> <li>▪ Parcel shipment quantities to relatively few customer or stores</li> <li>▪ Store generated purchase orders</li> </ul>
Direct from Customs	<ul style="list-style-type: none"> <li>▪ Very few stores or customers with pre-allocated product</li> <li>▪ Parcel shipments</li> <li>▪ Low margin, high volume product</li> </ul>
Border Transload Consolidation	<ul style="list-style-type: none"> <li>▪ Frequent receipts of small or less than full containers from foreign suppliers</li> </ul>
Inbound Consolidation/ De-consolidation	<ul style="list-style-type: none"> <li>▪ Postponing inventory allocation decision until need for long lead time product (e.g. foreign supply)</li> <li>▪ Break bulk (deconsolidation) of same product going to multiple destinations</li> <li>▪ Make bulk (consolidation) of LTL quantities from dense supplier base</li> </ul>
Central Transload Facility	<ul style="list-style-type: none"> <li>▪ Final destination is unable to receive an ocean or a rail container</li> </ul>
Central DC	<ul style="list-style-type: none"> <li>▪ Economies of scale for automation, systems, and freight</li> <li>▪ Customer lead time does not require multiple DCs</li> <li>▪ As Hub for downstream facilities:                             <ul style="list-style-type: none"> <li>- High cost and/or slower moving product</li> <li>- Long lead time product</li> <li>- Consolidating small shipments from multiple suppliers</li> <li>- Deconsolidating container and truckload receipts</li> </ul> </li> </ul>
Regional DC	<ul style="list-style-type: none"> <li>▪ Customer lead time requires multiple DCs</li> <li>▪ Region specific product</li> <li>▪ Faster moving product</li> </ul>
Cross Docking Center	<ul style="list-style-type: none"> <li>▪ Pre-allocated supply in frequent LTL quantities from multiple suppliers destined to multiple locations</li> </ul>
Outbound Pool Point	<ul style="list-style-type: none"> <li>▪ Break bulk (deconsolidation) of product going to multiple locations, generally within a 150 mile radius</li> </ul>
Local Warehouse	<ul style="list-style-type: none"> <li>▪ Safety stock for high availability product serving multiple stores or customers</li> <li>▪ Large, bulky product otherwise consuming store floor space</li> <li>▪ Product for consumer delivery in local market</li> </ul>

## Impact on Financial Performance

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So, what is the impact of Product Flow Path Design on the supply chain? And, more importantly, how does it impact financial performance?

The ultimate goal of any supply chain leader and any large investment in the supply chain is to maximize the return on invested capital (ROIC). The primary components of the equation are profitability and capital efficiency. So, the key question as a supply chain organization is “how do we help the company maximum profit and minimize capital assets?”



The simple answer is that there are a number of ways Product Flow Path Design can impact ROIC.

On the profit side, Product Flow Path Design impacts costs by minimizing net landed costs to the customer (which includes freight and warehousing expense). It also impacts revenue by enabling higher levels of service. For example, higher product availability of the right product in the right locations and at the right time means fewer stock outs and more sales. Less of the wrong product at the wrong place and the wrong time means less excess inventory needed to be sold at discounted prices or not sold at all.

On the capital side, Product Flow Path Design provides a myriad of opportunities to minimize the required investment in inventory and capital assets necessary to meet service needs. For example, flowing product through distribution nodes other than a large DC may mean a smaller commitment in space. Flowing slow moving product through a single DC rather than multiple locations may reduce inventory investment.

As you can see, Product Flow Path Design is not myopically focused on logistics cost. Instead, it takes a “bigger picture” view of supply chain assets, service levels, costs, profits, and investments. In fact, it’s sometimes possible logistics costs could rise by redesigning your product flow paths. But that should be perfectly acceptable so long as the business as a whole benefits from doing so. That is why we suggest using a broader economic model such as ROIC when evaluating product flow path alternatives.

### Summary

Your Distribution Network Design requires a very tailored but practical approach unique to the needs of your company, the products you offer, and the customers you serve. The strategic and tactical challenges you face are likely very complex. So, how successful and competitive will you be long term if you over-simplify your approach to distribution? Gain a step on your competition by tailoring your approach and innovating the paths you take to flow product across your supply chain. Think outside the box. Look beyond what you've done in the past or what your competitors are doing. Define the possibilities. Evaluate what is practical. And then reap the substantial financial benefits that await a tailored approach. It's worth the journey.

## About Fortna

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Our business-goal focused approach balances systems, processes, people and assets to optimize your supply chain and help you improve competitive advantages, achieve cost savings and improve service levels to your clients.

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