

CHASING AMAZON:
BUILDING A DYNAMIC WAREHOUSE NETWORK

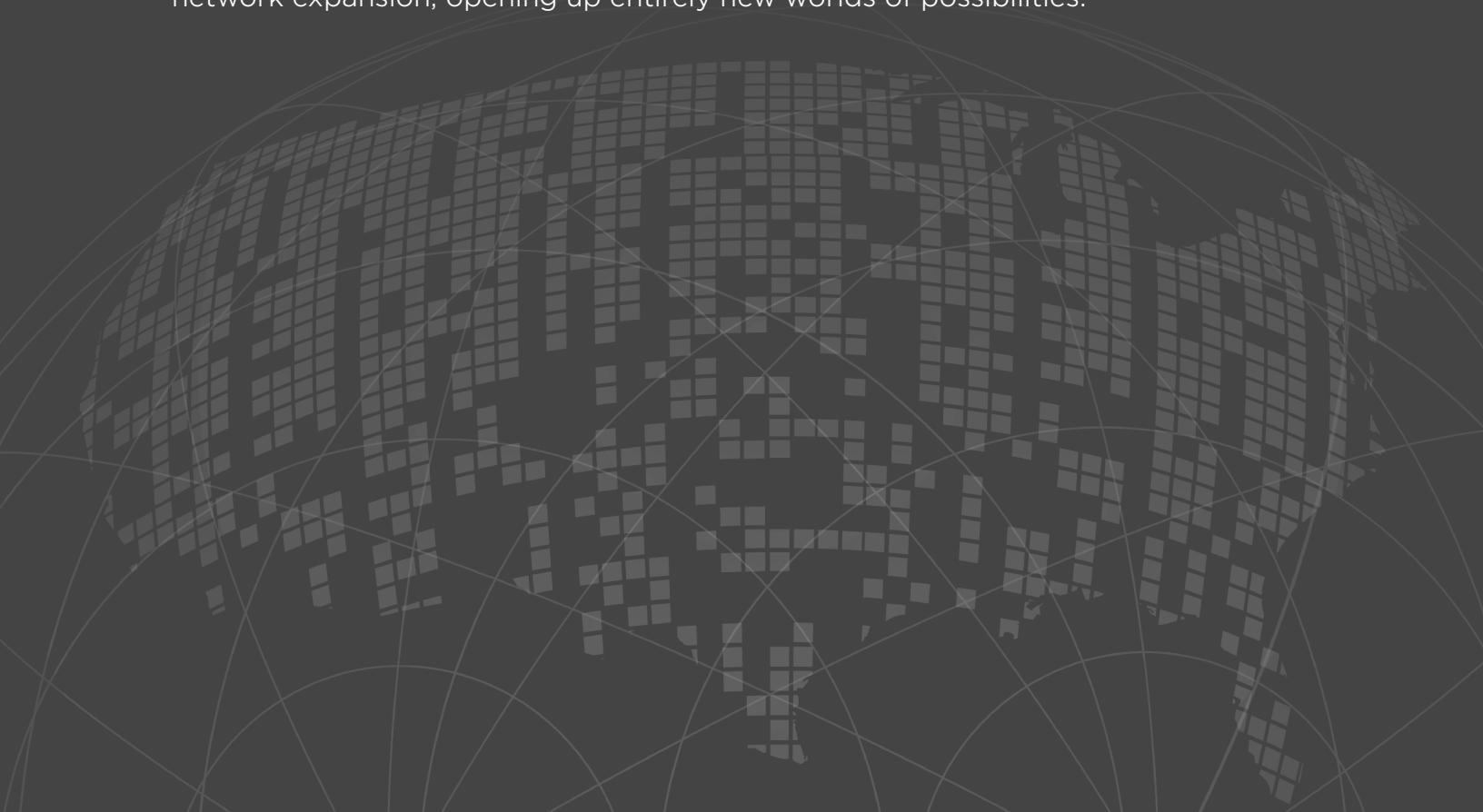
FLEXE

Research & Analysis by FLEXE, Inc. | Published May 2016

What is a Dynamic Warehouse Network?

The application of on-demand warehousing for distribution network capacity or growth challenges introduces more options into standard warehouse network planning. Traditionally, organizations have been limited to the two options of either ① building and operating or ② contracting with a 3PL to establish new distribution centers. Now, a third option of creating pop-up, or on-demand, warehouses can expand distribution in a new way.

On-demand warehousing takes advantage of unused space across hundreds of warehouses and makes it available via a cloud-based marketplace system. Cost/benefit analyses change because dynamic solutions do not require capital outlays or long-term commitments. That means a Dynamic Warehouse Network strategy enables you to significantly reduce the costs, time and complexities involved in network expansion, opening up entirely new worlds of possibilities.





Amazon Has Changed Consumer Expectations

Amazon has become a retail giant by improving the customer experience at every stage in the purchasing lifecycle — including personalized recommendations, pricing and availability, free and same-day shipping and hassle-free returns. It turns out (and this shouldn't surprise anyone) that consumers want access to more stuff. They want to buy it as quickly and easily as possible. They want low prices. And, they don't want to wait for the products they buy.

That's precisely what Amazon is offering and why they're so successful. Some of those advantages are tied closely to their innovative approach to supply chain design, particularly pricing and quick delivery. In order to compete, most of Amazon's competitors are feverishly playing catch-up. If your company is among them, reassessing your supply chain design is a good place to start. Amazon Prime members enjoy free two-day shipping on many of the items they purchase. This benefit creates four primary problems for Amazon competitors:

- **More Sales for Amazon:** It drives Amazon Prime members to purchase more of their products on Amazon, which means fewer purchases on competitor sites or physical retail locations.

- **New Shipping Standard:** Prime consumers expect two-day shipping across all online retailers, with one-day shipping becoming more common. 5 - 10 day ground delivery doesn't cut it with them anymore.

- **Low Shipping Rates:** The perception of "free shipping" or even low cost per order fees makes it very difficult for other online retailers to appear price competitive.

- **Shopping Cart Sell-Through:** Many studies have been conducted on the reasons consumers abandon online shopping carts before they complete their purchase. One of the top reasons consistently cited in those studies is the surprisingly high shipping costs that are revealed when the customer goes to check out. Amazon's free two-day shipping service eliminates that common cause of cart-abandonment for millions of their customers.

Amazon and eCommerce Hit a Home Run During the Holidays

The growth in online sales significantly outpaced The growth in industry-wide online sales significantly outpaced the growth in overall holiday retail sales. Online purchasing and shopping behavior also significantly surpassed pre-season expectations. And did so in a few ways that will have many retailers (both brick and click) rethinking aspects of their supply chain models.

Holiday eCommerce exceeded pre-season estimates significantly. Online sales topped $3 billion on Cyber Monday (up 16.4 % from last year), making it the biggest day of online sales in US history. And, online sales over Black Friday Weekend also rose more than 16%, generating nearly $4.5B in online sales. All in, eCommerce generated nearly as much revenue over just the four days that followed Thanksgiving as it did for the entire holiday season the previous year. Amazon's Cyber Monday was 21.1% better than 2014. And their Black Friday was up 20.8%. Conversely, Black Friday sales for brick and mortar retailers dipped more than 10% compared to 2014 ($10.4B vs $11.6B) according to Shop-perTrak.

At the core of nearly every one of their disruptive services, Amazon has found a way to gain a competitive advantage by using innovative logistics as a strategic weapon. The company spent billions of dollars in warehouses around the US to accomplish this. With around 160 distribution, fulfillment, sortation and Prime Now Hubs in the US and same day shipping service now available to a third of the population, Amazon is dominating quick delivery. The key to competing in this quick-turn, fast-shipping environment is lowering total delivery times while also lowering distribution costs per order.

Amazon Prime gobbles up Last Minute Shoppers

Almost 60% of consumers polled by market-research firm NPD Group said they hadn't completed half or more of their shopping as of Dec. 13, up from 50% only a year earlier. By December 15, according to the National Retail Federation, the average holiday shopper had only completed 53.5% of their shopping.

To take advantage of this shift, Amazon aggressively established 24 major markets (representing nearly 30% of North America) for same day shipping before the holiday shopping season began. Their strategy appears to have worked. Amazon signed up more than 3 million Prime members during the third week of December alone (to get free shipping and engage in last minute eCommerce on the Amazon site).



How Do Others Compete?

There are many factors to consider, but most of them have to do with reducing shipping costs. In many cases, shipping costs can be significantly reduced by rethinking supply chain design. Starting with customer expectations, two-day shipping has become the new standard. And, in many cases the most formidable competitor is offering two-day shipping for free. It may be a tall order to offer that service level for free, so the equation to solve is how to reduce shipping costs in order to offer the most competitive two-day shipping service possible.

The most sweeping reduction in shipping costs might be realized by adding distribution centers to a distribution network. Expanding a distribution network can significantly reduce shipping costs by shortening last leg shipping distances. Amazon now has more than 160 distribution and sortation facilities in the U.S. alone. They've invested in such a massive network so they can get as close to their customers as possible. Shortening the last leg between warehouse and customers reduces the number of shipping zones packages must travel through, shortens delivery times, and lowers delivery rates.

Amazon's massive distribution network also enables them to offer an aggressively-priced next-day delivery service and same-day service Prime. Out of competitive necessity, many traditional retailers are pushing hard to reshape their customer experiences. More retailers, both pure-play eCommerce and omnichannel, are offering Amazon Prime-like services that include free shipping and other benefits for an annual subscription fee. It's good for customer loyalty but may also require logistics changes, such as expanded localized warehousing and fulfillment, in order to keep costs in check and meet delivery promises.

Competing with Amazon

Online buying, in-store pick-up:

One of the key omnichannel advantages of brick and mortar retailers is a service that enables customers to order products online and easily pick them up in the store. If the item isn't already on-hand at that location, quick delivery is critical.

In-store browsing, online buying:

A key benefit to an omnichannel strategy is that buyers can visit the store and see the product before they buy. As omnichannel retailers tie their in-store and online experiences together, more consumers are using the retailer's apps and mobile sites to price and order those products online while they're in the store. Once they've seen those products in the store, they tend to expect those products at their door in short order.

Faster delivery:

With around 160 distribution and sortation centers around the US and same day shipping service now available to a third of the population, Amazon is dominating quick delivery. The key to competing in the quick-turn arena is finding a way to lower cost per order. Consider a less rigid, more distributed approach, like a using a dynamic warehouse network.

Free delivery for "members":

More retailers, both pure-play and omnichannel, are offering Amazon Prime-like services that include free shipping and other benefits for an annual subscription fee. It's good for customer loyalty but may also require logistics changes, such as expanded localized warehousing and fulfillment, in order to keep costs in check and meet delivery promises.

Marketplace-based buying:

Marketplace sites like Etsy that enable users to easily shop across thousands of sites are becoming more mainstream. Shoppers on those sites often make their choices based on price and availability of a particular item. As that buying behavior trends upward, so will the need for cost-efficiency and on-hand or available drop-shipped inventory. Marketplace-based buying can work against omnichannel retailers because brand loyalty is often less of a factor, so omnichannel retailers have to be every bit as competitive in this arena as their pure online counter-parts.



Warehousing Investment & Inventory Dynamics

Many different kinds of companies, including manufacturers, distributors, wholesalers, importers and retailers, operate multiple warehouses. Usually, these are strategically located facilities entrenched with long-term leases and a full-time staff. Some companies work with third-party logistics partners (3PLs) to operate and/or extend their storage and distribution capabilities and footprint. In either case, their warehouse network is typically static and set up to accommodate consistent, expected inventory volumes. But, even the most optimized warehouse network can exceed its limitations in situations that produce temporary or unexpectedly high volume, or a growth profile that differs from the original forecast. Adding on-demand warehousing where and when you need it introduces elasticity to your overall warehouse space and makes your warehouse network much more dynamic, so you can address the unexpected with greater agility and take costly commitments out of the equation.

Historically, when organizations have faced peak volume circumstances, they have typically sought short-term warehouse leases to temporarily expand their capacity. But those short-term commitments are rarely short, the terms are rarely favorable and the approach is anything but dynamic. It takes time to find a suitable facility and leases can take an uncomfortably long time to negotiate, close and get set up. Then, once secured, the space may not be immediately available or adequately configured.

Both approaches suffer when demand is variable: because either they're built to handle peak volume and are often underutilized, or are built for average volume and run out of space at peak demand. Beyond even these challenges lies the simple issue of scale. How many companies can even consider creating 10-20 distribution centers, let alone the 160 that Amazon operates? Scale is critical. Flexibility is critical. But spending billions is largely impossible. **Today's companies need to find an answer to this challenge.**



But What If You Could Expand Without The Spend?

If you could expand a warehouse network without the burden of capital expenditures or fixed or committed spend then competing with Amazon and providing advantageous shipping terms would be more feasible. Adding flexibility in warehouse capacity increases the ability to respond to demand variability. Removing the burden of fixed, startup and committed costs increases the financial feasibility of operating at scale. With a warehouse network that's infinitely flexible, logistics leaders can think beyond the confines of their static network of fixed warehouse assets. And companies, big and small, can become more agile, more responsive, more competitive and better positioned for growth.

The flexibility of dynamic warehousing takes the friction out of warehouse expansion, whether for temporary seasonal peaks or product promotions, or on a more permanent basis. Scale becomes instantly available as you tap into unused space across hundreds of warehouses. Short-term capacity problems are easier to solve. More options are available in warehouse network planning exercises. Cost/benefit analyses change because dynamic solutions do not require capital outlays or long-term commitments. That means a Dynamic Warehouse Network strategy enables you to significantly reduce the costs, time and complexities involved in network expansion, opening up entirely new worlds of possibilities.

What would the economics
OF THAT SITUATION have to look like?

Can on-demand warehousing help
MAKE A SOLUTION like that possible?

Step One:
Determine Network Required to Achieve Desired Responsiveness

Step one is to focus on the impact of adding more distribution centers in order to drive shorter delivery times, while at the same time maintaining the same costs per unit shipped (think standard ground shipping rates vs. expedited/air). This capability may be thought of creating "responsiveness" in your supply chain. Greater responsiveness can be measured as the total percentage of product shipments that arrive within one or two days. Using Starboard Solutions' Tactician software, different scenarios are modeled, analyzed and presented for comparison. In addition, Amitabh Sinha, Associate Professor of Technology and Operations from the Ross School of Business at the University of Michigan, together with his graduate team, reviewed the models and furthered the analyses to better understand cost levels associated with different options.

Example Customer Profile

LA-Based E-Commerce Company

- **$50MM sales**
- SKUs: **500**
- Orders per year: **1MM**
- Units per order: **1.5**
- Customer demand map: **mirrors US population**
- One current DC: **95k sq ft in Ontario, CA**
- Current delivery: **12% orders 2 days or less by ground**
- Transportation cost-per-order: **$9.53**
- Goal: **70-90% of orders delivered in two days or less**

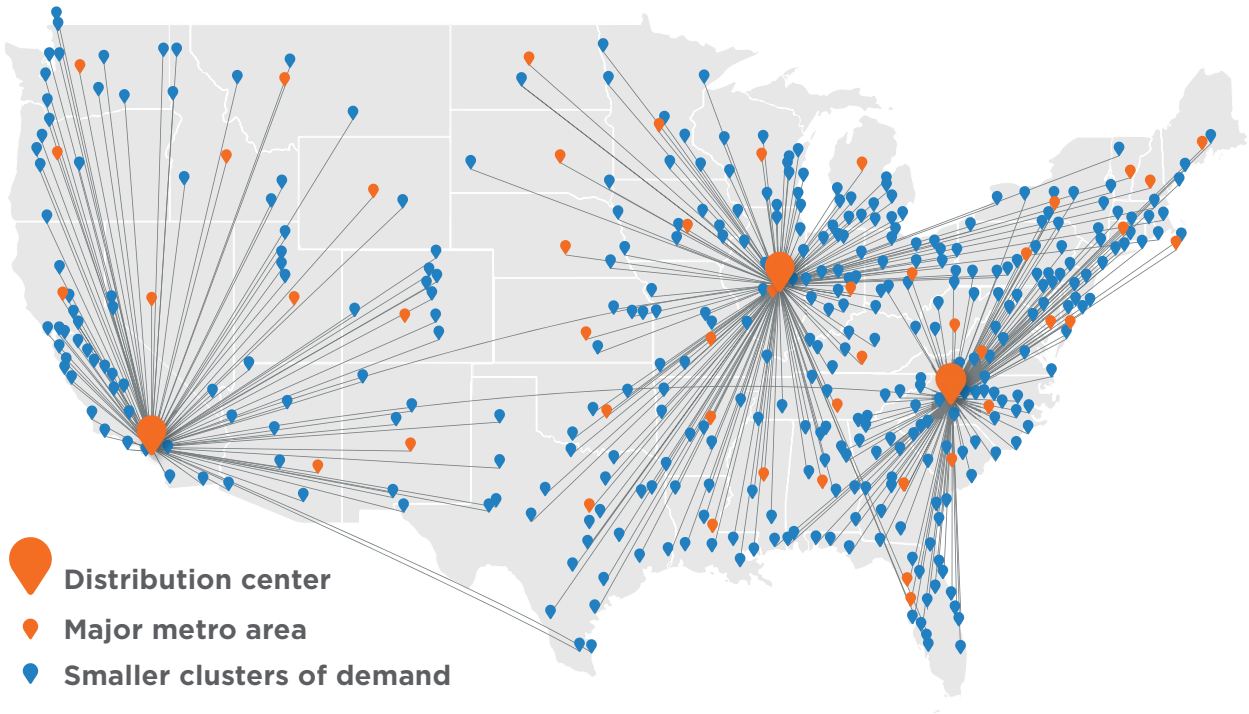
Based upon the example customer profile above, the eCommerce company has a single distribution center in Ontario, California. A network analysis based on that situation shows that only 12% of shipments will arrive within 2 days by ground. This is clearly due to the fact that the single distribution center would have to send product across multiple delivery zones to reach much of the country, driving up shipping costs.

70% of orders delivered within two days

So, what would it require for this e-commerce firm to deliver 70% of orders within two days? Network analysis reveals the need for a distribution network consisting of three cities — potentially in southern California, Illinois and North Carolina. Here, transportations costs-per-order come in at $7.76, which is a notable cost-per-order decrease due to significantly shorter parcel lanes.

3 Distribution Center Network

Locations	Size (sq ft)	Utilization	Startup Costs	Annualized Lease Cost
Fullerton, CA	22,000	95%	$110k	$158k
Decatur, IL	38,000	95%	$130k	$275k
Statesville, NC	34,000	95%	$125k	$244k
Transportation Cost-per-Order: $7.76				



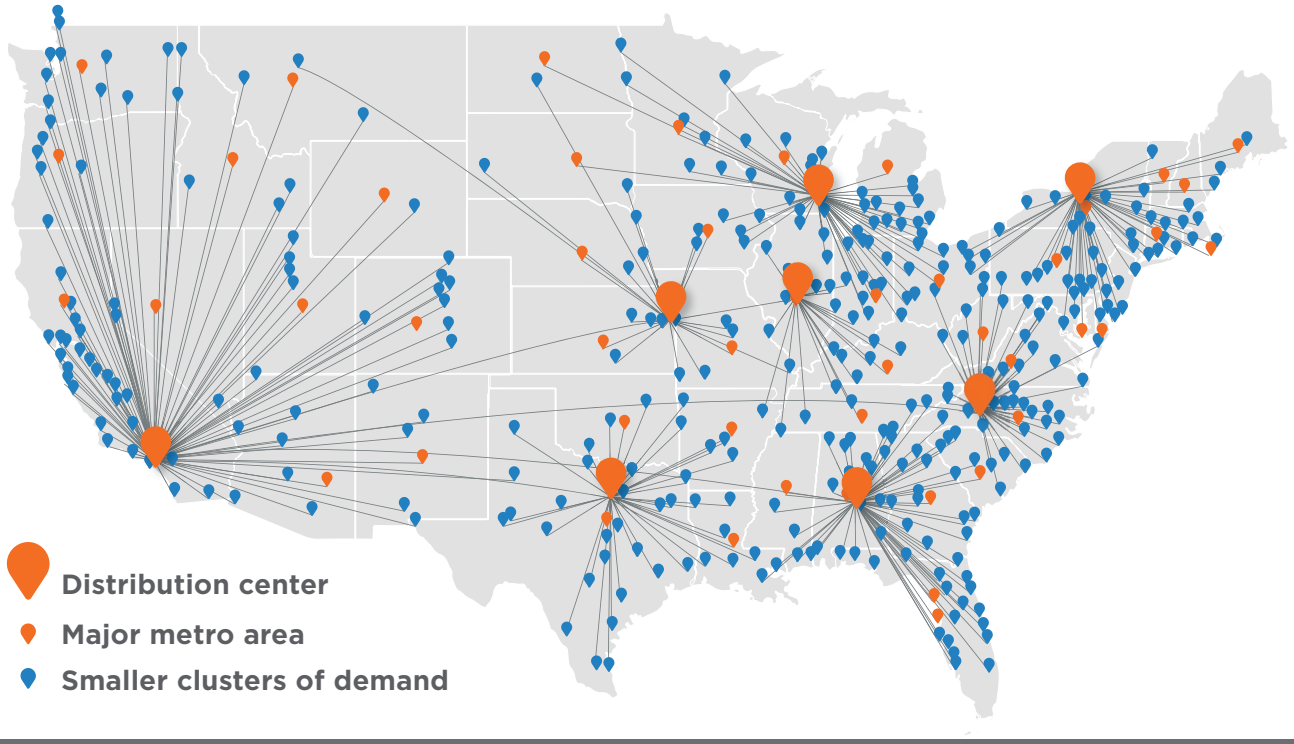
90% of orders delievered within two days

If that same firm opted instead to deliver 90% of orders within two days then their distribution network would need to expand to eight cities. Note that transportation costs per order do not change significantly, yet start-up and lease costs increase.

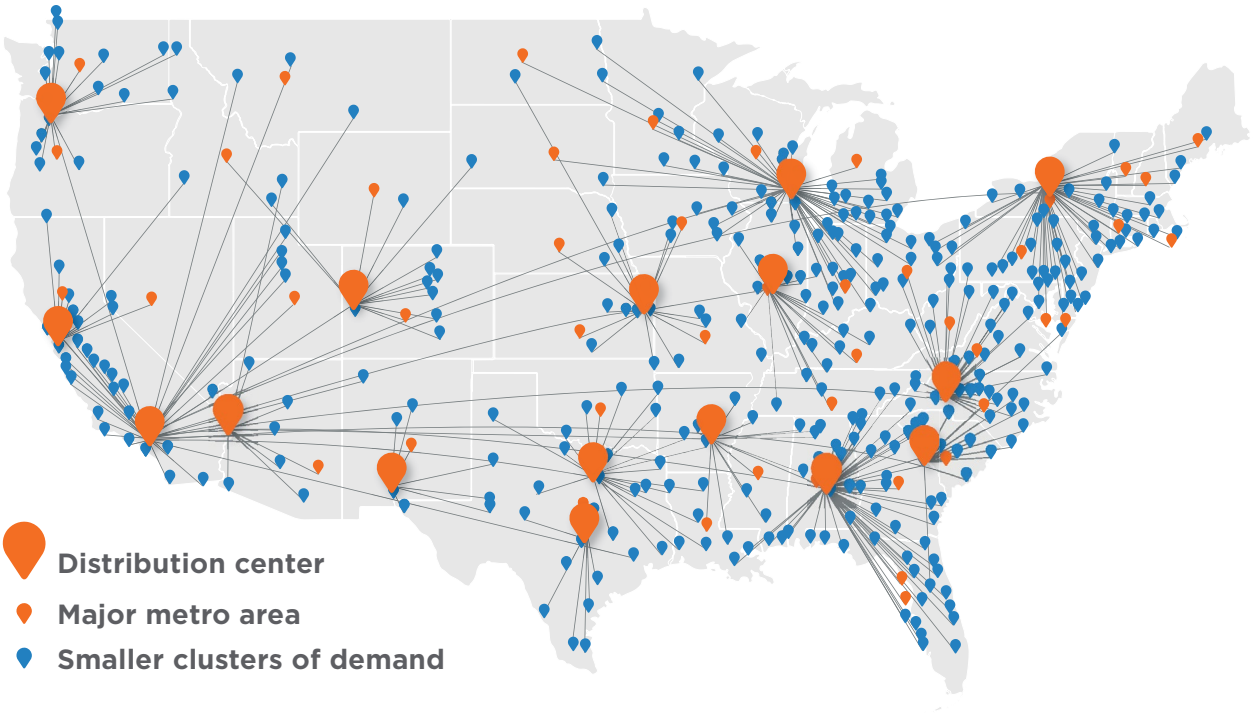
8 Distribution Center Network

Locations	Size (sq ft)	Startup Costs	Annualized Lease Cost
Santa Fe Springs, CA	21,300	$99k	$153k
Fort Worth, TX	10,700	$88k	$77k
Kansas City, MO	3,400	$81k	$24k
Decatur, IL	4,900	$82k	$35k
Statesville, NC	9,400	$87k	$68k
Montgomery, AL	13,200	$91k	$95k
Syracuse, NY	18,800	$96k	$135k
Milwaukee, WI	12,500	$90k	$90k

All warehouses utilized at 95%
Transportation Cost-per-Order: $7.48



If the eCommerce firm wanted to look even more aggressive and explore options that would allow it to deliver products in one day, the need for additional distribution centers grows significantly. That level of delivery requires a distribution center in nearly every major metro area. To achieve these goals, the network map starts to look very similar to Amazon's distribution center network:



Step Two:
Compare Traditional Warehouse Expansion to Dynamic Warehouse Expansion

This analysis above likely confirms what you already know about your business: it takes more distribution centers, in more locations, to deliver one or two day shipping options at manageable costs. **But how much does building out a network like that cost? And how many companies can actually afford to do this?**

To explore the level of investment needed to make these choices, let's again use a customer profile to compare the economics of the two approaches.

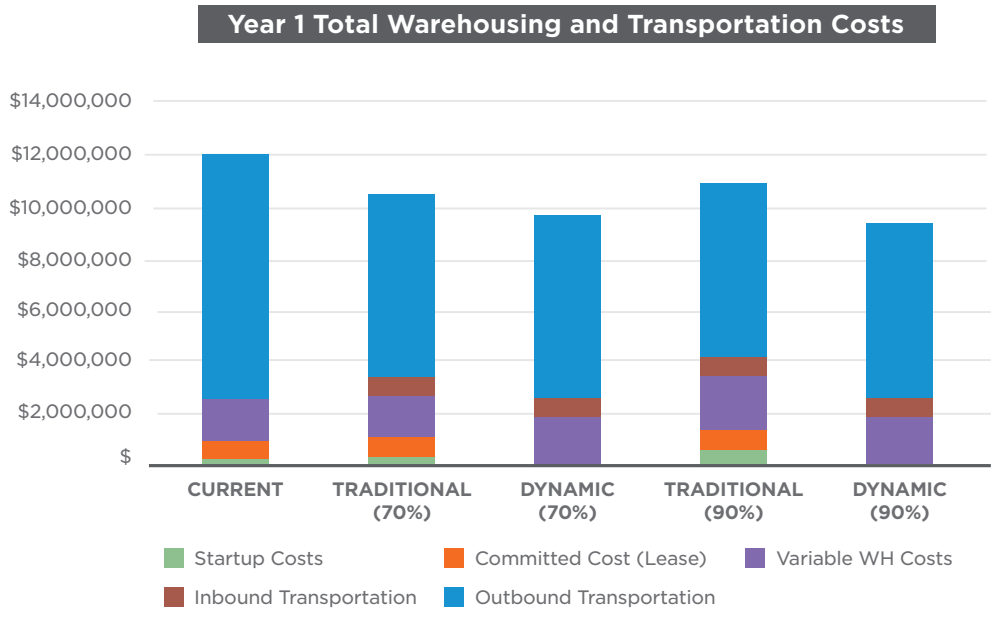
Base Assumptions:

- Lease term: **3 years**
- Lease cost: **$.60/sqft per month**
- Labor productivity: **120 orders per warehouse FTE**
- Inbound transportation: **FTL**
- Outbound transportation: **Standard parcel rates**
- One current DC: **95k sq ft in Ontario, CA**
- Dynamic WH costs: **Based on FLEXE marketplace rates**
- Annual order growth: **Baseline = 0%**

The analysis below, from the team at the University of Michigan, breaks down costs into the primary components associated with warehouse network expansion:

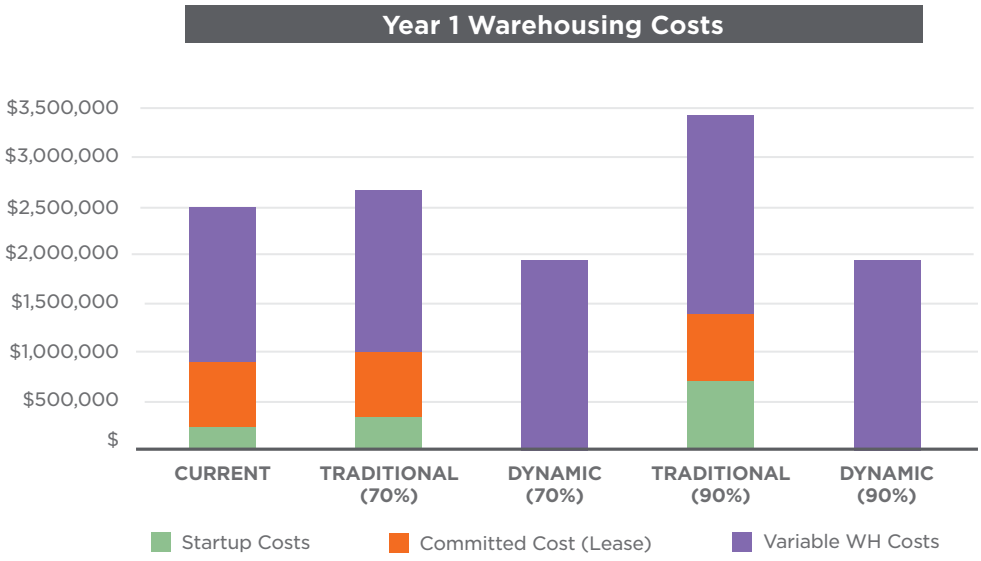
1. Start-up costs, which include investments such as racking, striping and physical setup and software systems implementation
2. Committed costs, which are the committed costs of the building leases
3. Inbound and outbound transportation costs
4. Variable warehouse costs which includes labor and material handling equipment within the Traditional solution, and includes the cost per pallet and per order in the dynamic warehousing solution described earlier.

Total Year 1 Distribution and Startup Costs



Comparing traditional and dynamic network approaches reveals a common dilemma for logistics managers. As would be expected, the larger DC footprint option that enables 90% of orders to ship by ground in two days have the lowest overall costs due to better-optimized transportation. But building out this option comes with significant upfront and committed costs, both for the 90% and 70% cases. In both scenarios, a dynamic approach reduces those startup and year one costs.

Year 1 Comparative Warehousing Costs



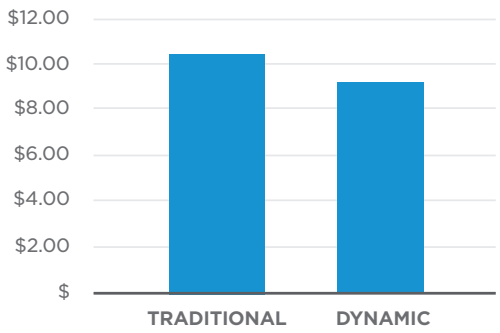
Focusing on just the warehousing costs begins to further clarify the fixed and committed costs. The 90% traditional warehouse footprint costs almost $1.5MM more than a dynamic approach. Even for 70% coverage, the cost differential is over $1MM. This graph only shows the first year costs. Extrapolate to a three year lease and the traditional committed and startup costs would be close to $3MM more than a dynamic approach.

To fully determine profitability, costs per order must be determined in order to understand the impact distribution costs have on total margins. Once again, the dynamic solution is more efficient, delivering roughly a 10% savings, as demonstrated by the chart on the following page. However, this assumes that the company had not forecasted growth in order to keep things simple during the planning process. Because of this its leased warehouses can maintain full utilization over the entire three-year period, keeping cost per units as low as possible.

When we adopt more real-world growth assumptions and the inherent uncertainty within any growth forecast, a more realistic picture of costs per order behavior emerges. In this "growth uncertainty" case, the company forecasts 30% yearly growth and has leased warehouse space to account for this forecast. When actual growth is exactly as forecasted, the warehouse utilization is very high at 95% and cost per order is optimized similar to the "no growth" case. But when actual growth is less than forecast, utilization drops and the fixed warehouse costs are spread over a lower volume of orders. As a result, costs per order increase to up to 20% higher as shown by the chart below.

Comparative Cost per Order "No Growth" Case

Year 1 Distribution Cost per Order in 8 DC Scenario (90% within 2 Days)

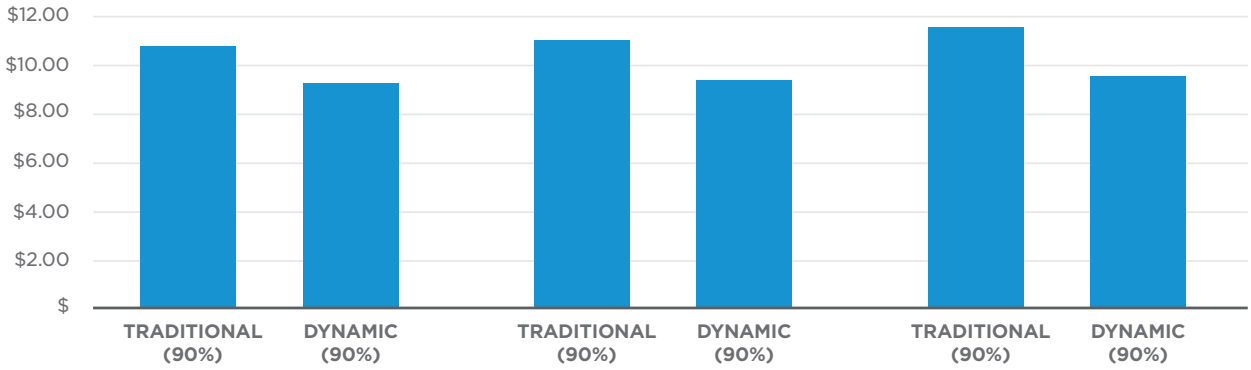


Total Warehouse Utilization: 95%

In a dynamic warehousing approach, all costs are variable, so the cost per order stays low and consistent across this range of growth. Considering that all businesses face uncertainties about growth and utilization, dynamic warehousing presents a potentially valuable solution for managing a growing warehouse network.

Comparative Cost per Order — Growth Uncertainty

Suppose you've built up assuming 30% annual growth, but actual growth is different.



Warehouse Utilization: 95% | **Warehouse Utilization: 75%** | **Warehouse Utilization: 58%**



Conclusion

Today's supply chains have been built to be efficient and have been optimized for transparency and consistency. As a result though, they are also rigid. This simple fact has governed warehouse network strategy for decades. The challenge is that today's market dynamics are stressing this system. Customer expectations for same or next day shipping place new demands on supply chains. Broader market trends like shortened product lifecycles and great product variety, along with constant innovation from organizations like Amazon exacerbate those stresses even further.

Therefore, the supply chains of tomorrow must continue to be efficient, but also be flexible. Warehousing — once associated with long-term commitments, large up-front costs and little dynamic flexibility — is at the heart of this new approach to creating an elastic supply chain. The equation used to determine how many and where to place distribution centers is changing with advances in technology and marketplace dynamics.

Dynamic warehousing strategies allow logistics professionals to expand their distribution centers in ways never before imagined. **The benefits of this approach are potentially game changing:**

1. Companies can now consider adding more distribution centers than ever before
2. Companies can add dynamic distribution solutions with no capital outlays or long-term commitments
3. Significant reduction of costs, time and complexities involved in network expansion
4. Network expansion projects can be done with less cost, time and complexity

Dynamic warehouse networking is the secret weapon retailers of all kinds can use to effectively compete with the scale, investment and innovation of companies like Amazon. It levels the playing field by enabling you to match Amazon's scale with industry scale and fights size with flexibility. It allows any size organization to expand its distribution scale without major investments or long-term commitments. Yes, customer expectations have changed, but so have the tools at the disposal of logistics professionals. As customer experiences become more advanced, supply chains must become more elastic. The companies that achieve that flexibility will thrive. Those that don't will be added to the list of businesses Amazon has left by the side of the road.

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