Designing Domestic and Global Supply Chain Networks

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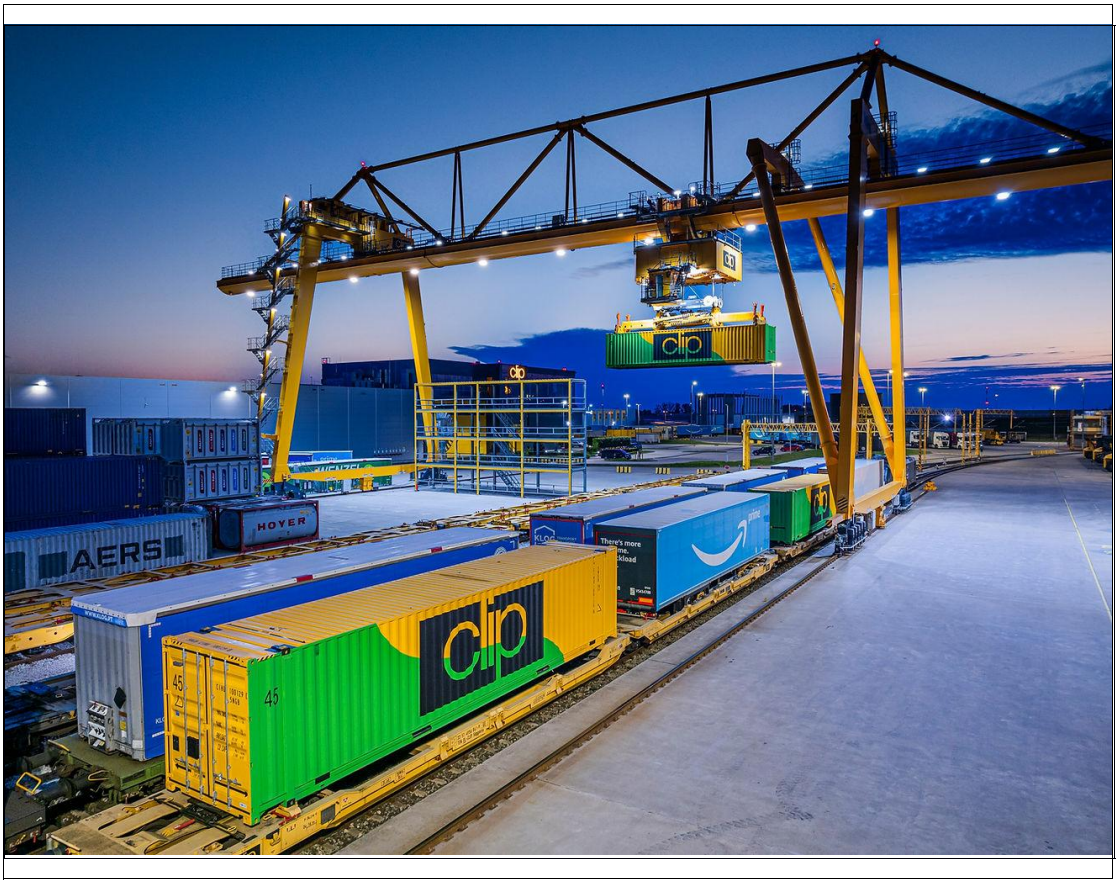
Due to the of the popularity of online shopping, the logistics has become even more essential for businesses. Warehousing is now an important part of the supply chain of todays modern enterprises, and it has developed from original goods storage to other operations, such as transportation and storage (Chen, J. et al., 2022). Decisions on where to place warehouses are important choices to make in order to save on cost and to distribute products to multiple end consumers for the lowest cost possible, making it essential for todays leaders to understand warehouse location methods. In regards to the effect on performance, location and size drive delivery speed, transportation cost, inventory costs, and customer service levels. Having good location placement with the right sizing can increase customer satisfaction and profit. On the other hand, bad investment decisions can lead to raised fixed and variable costs and reduce operational flexibility.



Small local warehouses can provide faster delivery and lower last-mile cost per package. Fewer fulfillment centers can lower inventory duplication, and better automation, but increase last-mile transit time and shipping costs. Larger warehouses need more capital, automation and management but can lower unit handling costs. Having closer warehouses can allow Amazon to provide same day delivery with a higher network inventory.

The factors that Amazon should take into account include customer geography, transportation, labor, warehousing space, taxes, and tariffs. Customer geography is essential since location can affect delivery time and customer satisfaction. The transportation infrastructure is important to consider since the distance to nearby highways, airports, and railroads all affect the supply chain. Additionally, a countries labor market varies by available talent and wages, making it essential for Amazon to stay informed of changing laws in wages and currency exchanges. Real estate costs and space availability, along with tax incentives and local regulations will also be important to be able to make informed decisions on what size a warehouse would be most profitable without overpaying on overhead costs. Customs and international logistics may also be a hurdle that Amazon can face and should consider in order to be resilient against disruptions such as cargo theft, loss, or unexpected oversea fees.

How import duties and exchange rates influence location decisions

Import duties can result in an increase of the costs of imported finished goods. This in turn can encouraging companies to find production or assembly warehouses nearer the end consumer. Import duties and exchange rates also drive the shift of sourcing out to low cost countries, or split production across countries to minimize import duties. Furthermore, it encourages location placement decisions based by the ability to produce low cost components and finish assembly in low cost tariff markets. In regards to exchange rates, a weak local currency makes local production cheaper for exporters, and a strong local currency makes exporting less competitive. Companies may prefer locations with stable currencies or make decisions based on currency trends for relocation of some production to a currency with expected depreciation to lower costs.

How a rise in transportation costs affects global supply chains

Shifting transportation from air and sea to railways is usually done to save costs, so if the costs of transportation were to increase it would be predicted that companies would rely more on railways. Railways can play an essential role in the transportation network, highlighting how essential rail freight is in the supply chain as it is an established and cost effective method of transportation around the world (Przekota, G. et al., 2024). A rise in transportation costs would also affect global supply chain networks by some companies making the decision to move their manufacturing closer to demand and end consumers as part of its warehouse location strategy. Furthermore, To save unit transportation cost, companies might react by increasing shipment sizes and reducing shipment frequency in order to ship-out a larger quantity of products

with less needed transportation. Companies would then likely consolidate to fewer, larger warehouses to grow in production, or add local warehouses to cut last-mile distance.

Amazon adding new warehouses: How costs and response times change

These changes can help Amazon in having more inventory closer to customers, shorter transit times, provide same-day or next day delivery., Thus creating a higher customer satisfaction level. Shorter distances would mean faster delivery and lower costs that can come from failed delivery attempts and customer service. Finally, Amazons fixed costs would grow due to an increase in facility space, rent, utilities, local staffing, maintenance, and automation costs.

McMaster-Carr vs W.W. Grainger: Pros & Cons

McMaster-Carr Pros:

Lower inventory duplication means lower aggregate carrying cost.
Simplified inventory planning and forecasting.
Strong fulfillment focus for e-commerce orders.

Cons

Longer last-mile distances means higher parcel costs or longer delivery times for some customers.
Less physical presence for immediate pickup/returns or walk-in sales.
Vulnerable to regional disruptions.

Grainger Pros:

Local availability and immediate pickup.
Better customer relationships through local sales reps and store service.
Retail footprint can act as fulfillment and returns centers.
Reduced heavy finished goods transport cost for bulky items through local inventory.

Cons

High fixed and operating costs for many stores.
Considerable inventory duplication and complexity in inventory balancing.
Harder to centralize automation benefits.

Both strategies seem to work since both companies are not the same so using different strategies seems more effective. For example, if customers demand fast, in-person access to parts, many retail locations are valuable. On the other hand, If the business is mostly running through online orders with predictable lead times and many SKUs, a centralized e-fulfillment model can be more efficient.

Apple and Dell: Pros and Cons

Pros

Lower costs for unit manufacturing.
More focus on employee talent and suppliers.
Easier logistics control.

Cons

Risks of trade conflicts at locations overseas.

Increased shipping costs to reach end consumers.
Exposure to tariffs and exchange rate changes.

Ford's Pros and Cons

Pros

Proximity to markets reduces transport cost for heavy finished products.
Faster distribution of products.
Easier to manufacture vehicles to meet regional regulations.

Cons

Higher costs for operations.
Increased risks from lower plant utilization if demand changes.
Higher complexity across suppliers for quality standards.
Manufacturing and shipping finished automobiles is expensive and complicated. Local production makes sense to reduce transportation costs and comply with regulations. Thus, having many facilities is often appropriate for auto makers.

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-Miguel Virgen, PhD Student

Further Responses and Discussion:

" Hi Miguel,
Thank you for sharing such a thoughtful post on the critical role of warehouse location and size for a company like Amazon in the era of rapid e-commerce growth. Your discussion highlights many of the core trade-offs and I'd like to build on your points by weaving in recent academic evidence, practical implications, and a biblical perspective on stewardship.

Warehouse location and size: Impact on Amazon

You correctly note that placement of warehousing influences delivery speed, last-mile cost, service levels, and fixed vs variable costs. Recent empirical research supports

this: for example, a spatial study of e-commerce logistics platforms found that firms such as Amazon locate facilities in ways that reflect delivery-radius demands, population density and road network centrality. Location closer to dense customer bases reduces transit time, enhances customer satisfaction, and provides a competitive advantage.

Additionally, the size of a warehouse matters: larger facilities can benefit from scale economies (automation, higher throughput, better utilization), but they may increase fixed overhead and last-mile transport distances for some customers. A 2024 study found that spatial patterns and investments in large-scale warehouse networks were shifting to better support e-commerce. For Amazon, balancing the number of warehouses (many smaller, local ones) versus fewer very large mega-hubs is a strategic design decision. Smaller local warehouses support faster deliveries (even same-day) and shorter last-mile legs; larger hubs lower per-unit handling cost but may raise last-mile cost or delivery time to end consumers.

From a practical perspective, Amazon should consider:
Geographic coverage to meet consumer delivery promise (e.g., one-day or same-day)

Proximity to transportation infrastructure (highways, intermodal hubs, airports)

Labor availability and local wage/regulation environment

Real-estate cost and scale: size sufficient for automation/throughput, but not so large that inventory sits too far from customers

Last-mile footprint: the closer to end users, the better, but the incremental cost of additional small nodes needs evaluation

Strategic considerations & biblical integration

In building its warehouse network, Amazon faces a stewardship decision: how to best deploy capital and assets to serve customers reliably while controlling costs. The Bible remarks on wise planning: “The plans of the diligent lead surely to abundance, but everyone who is hasty comes only to poverty.” (Proverbs 21:5, English Standard Version Bible, 2001). Amazon’s network design is an example of diligence in planning to deliver abundance (customer satisfaction, profitability) rather than being hasty (adding capacity without analysis).

Also, diversification of warehouse size and location reflects Ecclesiastes 11:2 of the English Standard Version Bible, (2001), references dividing your portions into seven, or even into eight, because you never know what disaster may happen on earth. By spreading inventory across nodes rather than concentrating too much in one hub,

Amazon reduces risk from disruptions (natural disasters, labor strikes, transportation shutdowns) and supports resilience.

Additional nuance: Size-versus-service trade-offs in warehouse strategy

Your post mentions that fewer large warehouses can lower inventory duplication and benefit automation, but increase transit time. This aligns with research: e-commerce firms are increasingly demanding industrial real-estate space to support faster delivery, which means more, often smaller, nodes near demand centers. Furthermore, the e-commerce growth trend increases the need for logistics space; yet, location inside or near urban centers is becoming more constrained and more costly. So Amazon should calculate the marginal benefit of adding each node (service improvement) versus the incremental cost (rent, staff, transport).

One practical application for Amazon might be a hybrid design: large regional "super-hubs" for base inventory and high-throughput operations, complemented by smaller "micro-fulfillment" centres closer to high-density customer clusters that support rapid last-mile delivery. Research shows front-warehouse models (small local facilities) can minimize total cost and maintain service levels for fresh or time-sensitive goods.

Conclusion

You offer a good start in your post. For Amazon, site and size decisions are not simply choices of assets, but strategic levers of service level, cost structure, and risk mitigation. By presenting evidence of how site + size create delivery speed, inventory cost, and operational flexibility, we can show how Amazon can plan a network which achieves the best balance between efficiency and resilience, by employing biblical truths of good planning and diversification. Stewardship of resources means not just growing capacity blindly, but placing it wisely in relation to customer geography, transportation realities, labor/regulation environment, and long-term risk horizons.
Thanks again for initiating this discussion—your insights open important strategic questions for warehousing design in modern e-commerce supply chains."

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Author Note

Miguel Virgen, PhD Student. I have no known conflict of interest to disclose.
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