

# The European Distribution Network Paradigm

A white paper on distribution networks

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# Table of contents

<b>An Epiphany</b>	<b>2</b>
<b>1. The main cost drivers for your distribution strategy</b>	<b>3</b>
<b>2. The main product-/market aspects setting your distribution requirements</b>	<b>5</b>
<b>3. The best distribution strategy to comply with distribution requirements</b>	<b>6</b>
<b>4. The European Distribution Network</b>	<b>9</b>
<b>About the author and Groenewout</b>	<b>11</b>



## An Epiphany

Recently, I was driving home from a meeting with an international agricultural commodity producer. In this meeting we philosophized on their physical distribution strategy i.e. how many warehouses do we need and where to locate them. As I was listening to the radio a program was playing on effective communication. One of the statements made was that a journalist should rule out the use of fine distinction in his or her writing. Instead, the objective should be to state a clear, transparent and persistent message.

This triggered me to question if there was a standard distribution network strategy for the commodity sector, assuming that we were to rule out the inevitable daily operational nuances. Such nuances lead to all kind of logistics restrictions. Even better, we could take this one step further and determine if there is a pattern in distribution strategy over different sectors as electronics, FMCG, chemicals etcetera's.

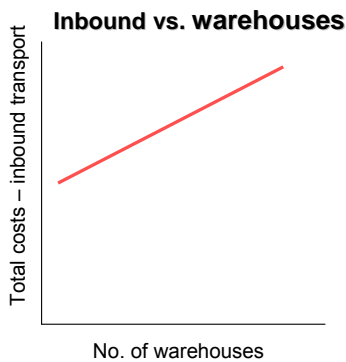
I reasoned that we could do this best by factoring in the following considerations:

- What are the main cost drivers when defining your distribution strategy?
- What are the main product-, and market aspects determining the distribution requirements?
- What is the best distribution strategy to comply with these distribution requirements?



# 1. The main cost drivers for your distribution strategy

In order to illustrate a relational function between financials and the distribution strategy, I've defined the general rules on the operational costs versus the number of warehouses.

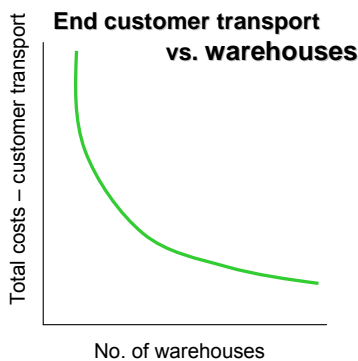
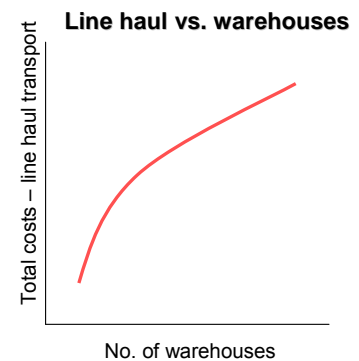


The inbound costs are those costs involved with getting the products from the manufacturing location into the warehouse. This could be sea- or air freight for intercontinental sourcing, or train- and road transport for European sourcing.

In general, the more warehouse destinations to serve, the more diverged the transport flow, the higher the inbound costs.

The line haul costs are caused by the volume flows between the individual warehouses, e.g. resulting from replenishment, rush orders etcetera's.

The more warehouses, the more these line haul flows will occur, thus resulting in higher costs.

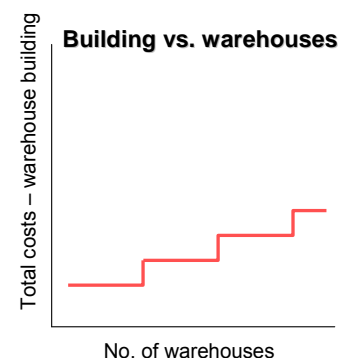


The "last mile" transport from the warehouse to the end customer is defined as the end customer transport costs.

The more warehouse locations, the lesser the average distance from warehouse to customer destination, the lower the transport costs per unit.

The building costs consist of all fixed costs around the warehouse building as rental costs per m<sup>2</sup> (or depreciation if the warehouse facility is owned), maintenance, energy, IT infrastructure, racking.

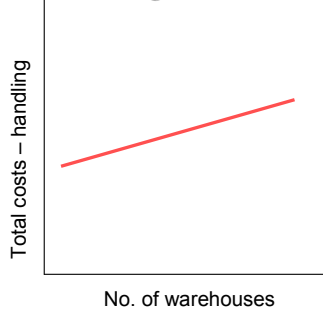
Needless to say, the more warehouses, the higher these building costs.





The handling costs are mostly determined by labor costs and the costs for logistics equipment as forklift trucks, AGV etceteras.

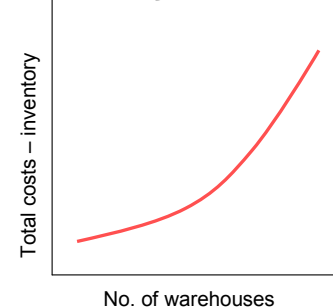
### Handling vs. warehouses



The increase in handling costs when operating more warehouses relates to two main aspects:

- 1) Lesser economies-of-scale, so more blue collar labor costs per shipment
- 2) More warehouses require more managerial staff, so higher white collar labor costs

### Inventory vs. warehouses

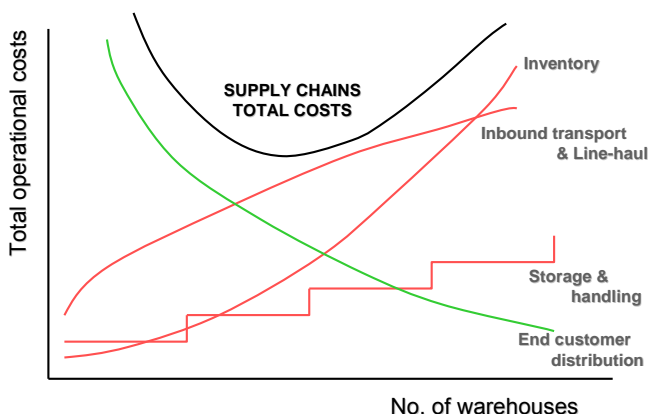


The inventory costs are the odd man out and therefore require some more explanation. The inventory costs specifically hold three main components:

- 1) the WACC (Weighted Average Costs of Capital) related to the invested capital
- 2) costs of obsolete stock, financial provisions
- 3) costs of damaged stock.

The extent to which a company can reduce inventory costs when consolidating inventory to fewer warehouses is determined by a number of factors:

- If there is no overlap between the articles (Stock Keeping Units: SKU's) present in the individual stock points, the idea of sharing safety stock in one point whilst delivering multiple sales countries/markets will not bear any effect.
- The strategy of postponement can support SKU overlap by only storing goods that are independent of country specifics in the main DC and for example, at the last minute incorporate the language manual when actually shipping the goods.
- The IT systems in the sales countries should be aligned. Too often European sales countries operate individual ERP-systems that are not integrated into one single company backbone. This does not provide the required integral transparency on forecast, sales orders and inventory (ruling out a European concept of Collaborate Production, Forecasting & Replenishment).
- Due to the remaining differences in European legislation between the individual countries (even within the EU itself), legal and fiscal trade-off considerations still could be decisive or the supply chain setup next to operational costs and customer service trade-offs.



Therefore the dilemma when defining the optimal financial distribution strategy is to balance all these costs factors to obtain the lowest overall total supply chains costs.



## 2. The main product-/market aspects setting your distribution requirements

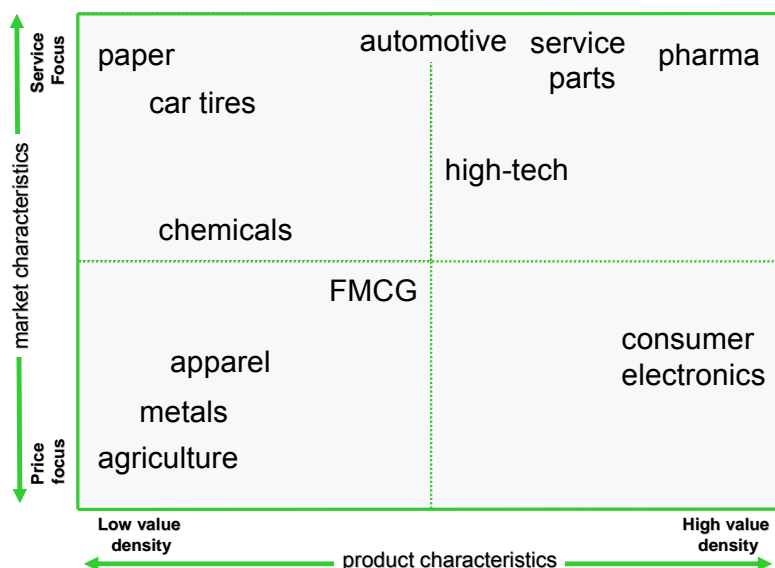
Rather than talking about supply chains, we should talk about demand chains as the supply chains strategy should be a derivative of your market strategy. How can supply chains help you in achieving a competitive advantage?

A discussion on those product- and market attributes that ultimately determine your distribution strategy could take hours. But remember that we promised ourselves to rule out the nuance, so I've distilled these factors to a two dimensional proportion:

- Market characteristics ► price focus versus service focus
- Product characteristics ► low value density versus high value density.

Rather than a theoretical explanation on this two dimensional structure, I would like to present some (undoubtedly arbitrary) examples.

FIG 1: The determining factors for your distribution strategy



### Price focus ► Low value density

Commodity goods like cement, metal, cacao, corn typically fit in this quadrant. No specific competitive advantage can be achieved through customer service (lead-time and delivery reliability), the market position is solely determined by product price. Margins are typically small and therefore the profit needs to come from volume.

### Service focus ► Low value density

The car tire industry is characterized by low value density goods, where lead-time is very dominant. Car repair centers require same day deliveries from manufacturers or distributors, as they do not stock all products. They only know what tires they require once you arrive at the garage all frustrated with your flat tire.

In the overall automotive industry customer service's dominance is more related to delivery reliability rather than lead-time.



Price focus ► High value density

Consumer electronics typically concern high value goods as TV's, copiers, computers. This particular market is increasingly competing on price levels with shop concepts as Media Markt, Circuit City and Dixons. The lead-time or delivery reliability is less of an issue, as long as the product shelf availability is guaranteed. This typically suits concepts as Vendor Managed Inventory (VMI).

Service focus ► High value density

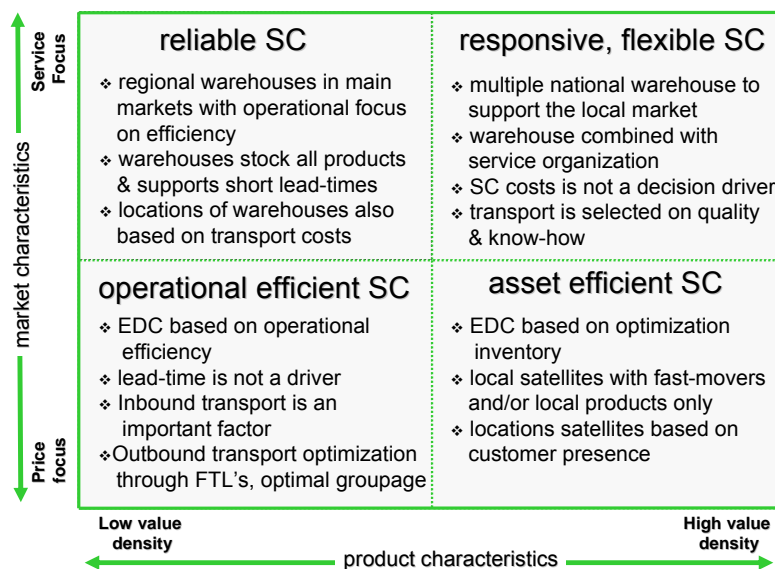
This quadrant holds a/o spare parts. Service, i.e. lead-time, is a vital component to reduce downtime in manufacturing environments. In this sector, customers can often choose between different service concepts (4 hrs, 12 hrs., next day) and tend to pay additional fees for this extra service.

In Pharma customer service is not measured in lead-time, but specifically in reliability given the health risks. This is covered through procedures as Good Manufacturing Practices (GMP) and Good Distribution Practices (GDP).

### 3. The best distribution strategy to comply with distribution requirements

If we take this market-/product concept and relate it to the specific requirements to your distribution strategy, we come to the following categorization.

FIG 2: Distribution strategy in the product/market quadrant





### The operational efficient supply chains



As customer service is not a market requirement and price is the competitive driver, supply chains can concentrate fully on operational efficiency.

In practice this means limiting the number of warehouses and assuring transport efficiency by creating as much Full Truck Loads or groupage transports as possible. This is done for instance by weekly milk runs per region.

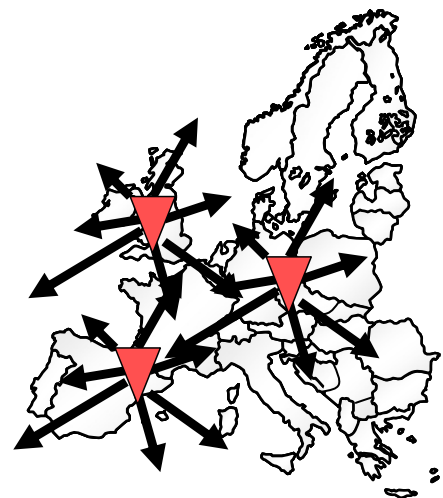
As this quadrant ships large volumes (i.e. commodities) the warehouses usually are located at the manufacturing plant to reduce inbound costs. If the product is sourced outside Europe, one European Distribution Center (EDC) is common, at European point of entry.

### The reliable supply chains

In this quadrant operational efficiency is an important advantage; however the options for supply chains are restricted as they need to comply with the market service requirements. To assure the customer service (delivery lead-time and reliability) multiple warehouses are operated in the main markets.

Inventory management over these warehouses has limited management attention, as the value density of the products is low. Ergo all warehouses carry the full product portfolio.

Transport efficiency is achieved by bundling the replenishment flows from manufacturing plant to the warehouses in line hauls. Outbound transportation is relatively a smaller piece in the total costs pie, with the main markets having their own warehouse.







### The asset efficient supply chains



With its price competitiveness, this quadrant has to focus on operational efficiency. However given the high value density of the product, this cannot be found in warehousing or transport, but instead in inventory.

When contemplating methods for reducing your inventory costs, centralization of the warehouse location in itself will not as a rule substantially reduce the total inventory in your supply chain.

Substantial reduction in inventory can only be achieved by having a pan-European inventory policy, where local stocks are coordinated and shared by the individual sales countries / warehouses. This can be done through one main European DC, but also through a “virtual warehousing” concept where one organization manages local inventories stocked at different local warehouses.

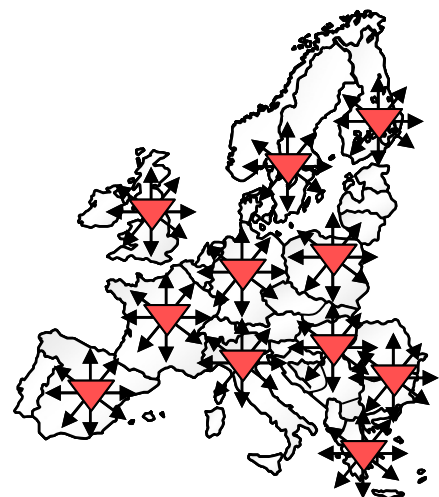
A structure with one EDC, supported by local satellites stocked only with fast-movers and local products is not uncommon. In such a distribution setup the customer service (lead-time) is maximized, without increasing the inventory levels (being the main logistics costs driver).

### The responsive, flexible supply chains

This quadrant has to deal with a high customer service focus. The problem however is, that it concerns high value goods. This leads automatically to a better ratio (*logistics costs / Costs of Goods sold*). Where the average over all industries in Europe is estimated around 6% to 7%, the maximum in e.g. the pharmaceutical industry is believed to be around 2.5%.

Given the relatively small logistics costs percentage in this sector, the focus is more on quality, reliability and responsiveness than it is on operational efficiency. The penalty clauses or health risk attached to a non-compliant delivery often outweigh any operational costs reduction in distribution.

A responsive, flexible, reliable market strategy can also be created in a one DC structure where 24-hrs. service is assured through air-transport or consignment stocks at customers premises.



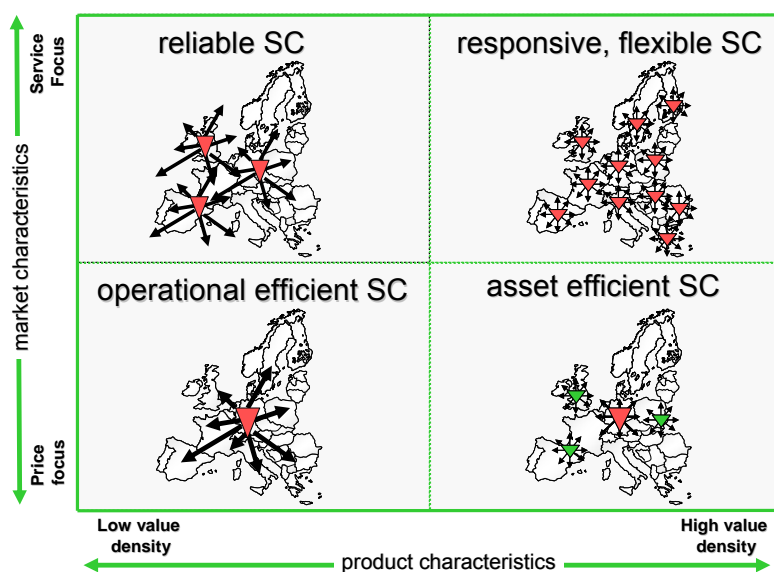


## 4. The European Distribution Network Paradigm

Specifically, for the last 15 years European distribution structures have been changing as corporation pursue opportunities brought about through the harmonization of EU legislation and IT-developments like a companywide ERP, VMI & Collaborative Networking provide.

It seems however that we can distill common best-practices by focusing on developed distribution strategies per industry segment, as long as we allow ourselves to focus on the main market and product issues within respective sectors.

FIG 3: The distribution network paradigm



As these distribution structures do not have an eternal life cycle, the question arises if the chosen distribution strategies still apply for the mid-term future.

There are a number of aspects that manipulate this answer, just to name a few:

- In-house company changes
  - mergers & acquisitions
  - changing cost prices of your products
  - global sourcing of (raw) materials in e.g. Asia
  - consolidation of business units
  - outsourcing of logistics activities
- Customer market changes
  - growing sales volumes
  - new, emerging markets in eastern Europe
  - different lead-time requirements
  - smaller shipment sizes



Apart from the micro-economic factors as shown; there are some macro-economic factors that require addressing.

- The governments of Europe are working together to tackle climate change and reduce the EU's carbon emissions. The supply chain is an important area where companies can reduce their carbon footprint. Therefore transport (and particularly road transport, because of its relatively high emissions per ton/ kilometer) will become a dominant factor in the Supply Chain design stage. Especially given the fact that over 80% of the carbon footprint targets are determined by the physical Supply Chain structure.
- The transportation costs will increase over the coming years per ton/kilometer, due to increasing fuel costs, regulations around clean engines, road toll, driver scarcity, etcetera's. This will shift the financial supply chains cost optimum in number of warehouses, with the transport component drifting upwards.

While I cannot predict with certainty as to whether your distribution strategy is viable for revision, I can assure you that it pays back to validate this at least every 5 years. The extent to which you can derive a competitive advantage from your distribution will depend on your distribution strategy and how it is operated. This is at least one nuance we should bring to the table!



## About the author and Groenewout



Alain Beerens is Managing Consultant & Partner with Groenewout Consultants & Engineers. Before joining Groenewout, Alain worked in the field of logistics & supply chain management for St. Gobain and JD Edwards. Alain has led major designs and redesigns of European supply chain concepts for numerous multinationals such as Syngenta, Canon, Johnson Diversey, Ciba, AstraZeneca, Nestlé, Solectron and Philip Morris. He has a Master's degree in Industrial Engineering & Management Science from Eindhoven University of Technology with a specialization in International Distribution Logistics. Alain obtained a CPIM certification in 1999.

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