What is a distribution center?

A distribution center (DC) is a node in a supply network which can be used for:
- storing goods (short term or longer),
- processing products,
- de-aggregating vehicle loads,
- creating SKU assortments,
- assembling shipments,
- among other things.

Some definitions of distribution center

- “a post production warehouse for finished goods held for distribution”
- facilities that “accumulate and consolidate products from various points of manufacture within a single firm, or from several firms, for combined shipment to common customers.”
- A type of warehouse where the storage of goods is limited or non-existent. DCs focus on product movement and throughput and information collecting and reporting rather than storage.

Contrast DCs and warehouses

- Warehouses hold all products
- DCs hold minimum inventories
- Warehouses have four activities in a cycle (receive, store, pick and ship)
- DCs have two activities (receive and ship)
Distribution Centers
Louis Luangkesorn

Role of DCs in supply chains

Supply chains have been changing over the past few decades

- Reduction in number of warehouses.
- Greater emphasis on the **flow** of goods rather than their storage. The emphasis on inventory reduction allows for closing of facility, closer control of safety stocks, and elimination of obsolete and slow-moving items.
- Increased outsourcing of warehouse/distribution center activities. This allows for third parties to provide increased economies of scale to their clients.

Roles of distribution centers

Some roles that a distribution center can take on include:

- Make-bulk/break-bulk consolidation terminal
- Cross-dock operation
- Transshipment node
- Assembly facility
- Product fulfillment center
- Returned goods depot

DC as a make-break/break-bulk consolidation center

- The traditional function of a distribution center
- Break-bulk facility - Large incoming loads are disaggregated.
- Make-bulk facility (consolidation center) - Small quantities of several different products are combined into fewer, larger assortments.
- Involves determining which products should be dispatched together, which customer orders will be combined, and when consolidated orders will be released.
- Used when products are shipped in packaging or quantities inappropriate for their final destination.
- E.g. Strategic National Stockpile

DC as a cross dock

Cross docking is the process where the product is received in a facility, occasionally married with product going to a same destination, then shipped at the earliest opportunity, without going into long-term storage.

- In cross docking, orders are fulfilled from the factory (or other source). The DC is merely a pass through point.
- Does not include traditional warehousing activities such as incoming inspection, storage, pick-location replenishment, and order picking.
- Allows for faster product flow and improved customer service.
- Reduced product handling. Leads to lower probability of damage and less wear on material handling equipment and labor.
- Lower inventory
Disadvantages to cross docking

- Complex planning and coordination is required.
- Most manufacturers are not equipped to efficiently create store-order quantity packages, so it could lead to additional costs in fulfilling from a distance plant instead of a local warehouse.
- Requires suppliers consistency in delivering proper quantities on time.
- Capital to sustain CD information systems and personnel that recognize their job is moving, not storing, product.
- Space for material staging, with appropriate docks and material handling.
- Inbound shipments which have been packaged into cases or pallets going to a single destination to minimize sorting.

Transhipment is another traditional role of distribution centers.

- Taking an item or shipment out of one vehicle and loading it onto another vehicle.
- This may or may not include consolidation or de-consolidation.
- Use when there is a need to change transportation modes or vehicle types.
- E.g. Line-haul transportation vs. local delivery. Delivery in dense urban areas.

A distribution center as an assembly facility has the following advantages

- Delaying item-differentiation, packaging and labeling
- Wait until more information is known about actual demands
- Product localization
- Example HP Europe
- A generic printer is made in Vancouver BC, Shipped to Europe. European DC which could do final assembly to produce 6 product lines in the proper quantities to match demand.
- Disadvantage - DC workforce are not generally trained or recruited for assembly

Fulfillment centers respond to product orders from the final customer, by shipping items directly there. These differ from traditional warehouses in the following ways

- Because fulfillment centers deal directly with end customers, customer service staff and procedures are important.
- Size of typical order is smaller, but the number of orders is larger
- Most or all orders are received electronically
- Fulfillment typically must receive and process customer payments (e.g. credit card)
- A large amount of time is spent dealing with returns from customers.
- Computerized information systems and task automation are increasingly critical, and the transportation function is more complex.
Reverse distribution channel deals with product returns. It tends to be more complex than the forward channel.

- Objective is to minimize cost while getting the product back to the forward distribution channel
- Without mixing SKUs
- Dealing with many small shipments
- Labor intensive - returned items must be inspected, separated into those that can be repaired or repackaged, sent back to supplier or scrapped.
- Often, a firm will outsource this to maintain a completely separate return channel to avoid mixing and complications

Measuring DC performance is really the ability of the DC to support the rest of the supply chain

- Benchmark performance against past results. e.g. other supply chain configurations.
- Looking at total costs: inventory holding, transportation and material handling.

DC performance measures

- Throughput
- Inventory turnover
- Cost per case/pallet/employee hour/etc
- Accuracy (order picking, shipping)
- Damage

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