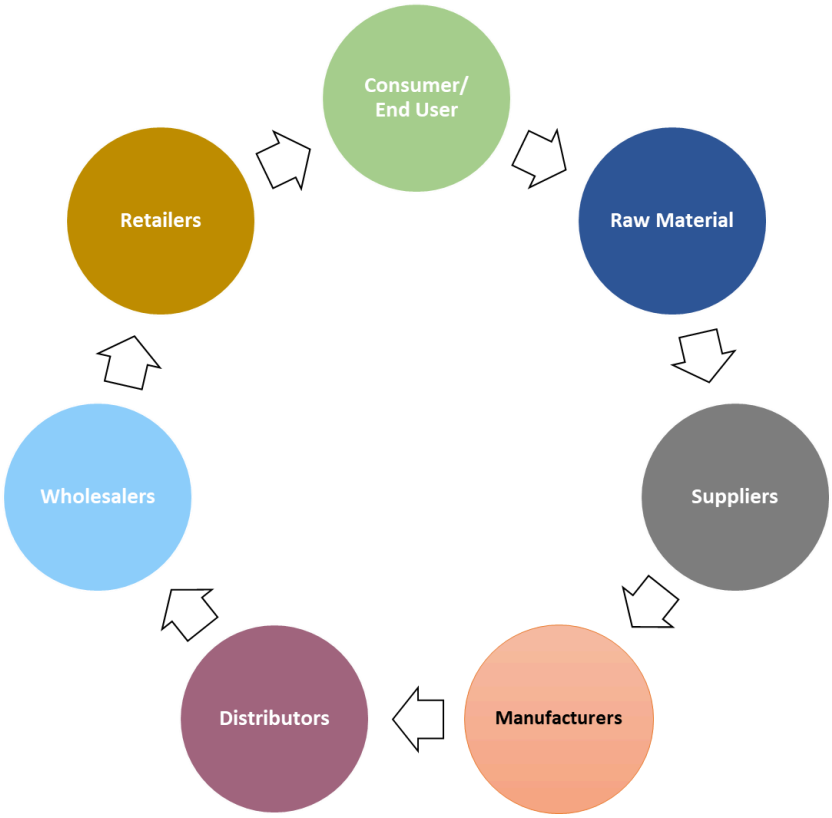
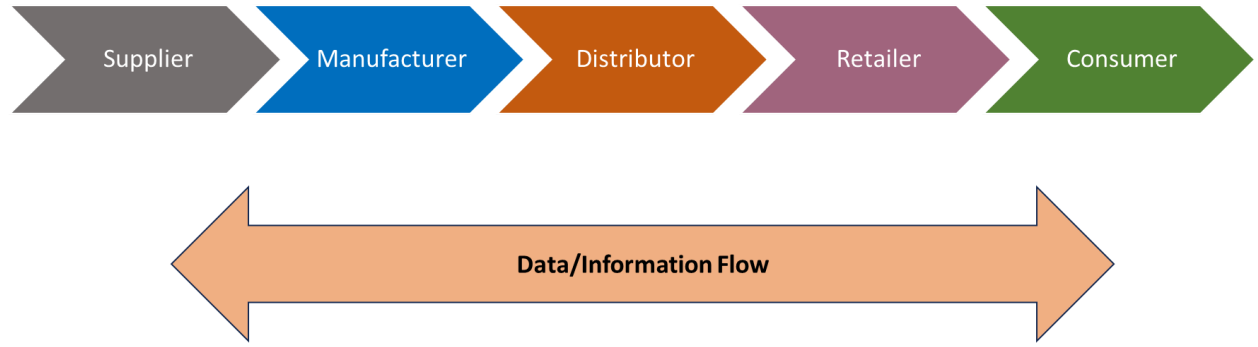
1. **Supply Chain Management**
    a. It's all about managing the flow of goods, information/data and cash related to a product or service.
    b. It starts from the consumer and ends at the consumer.
2. **Components of the Supply Chain**



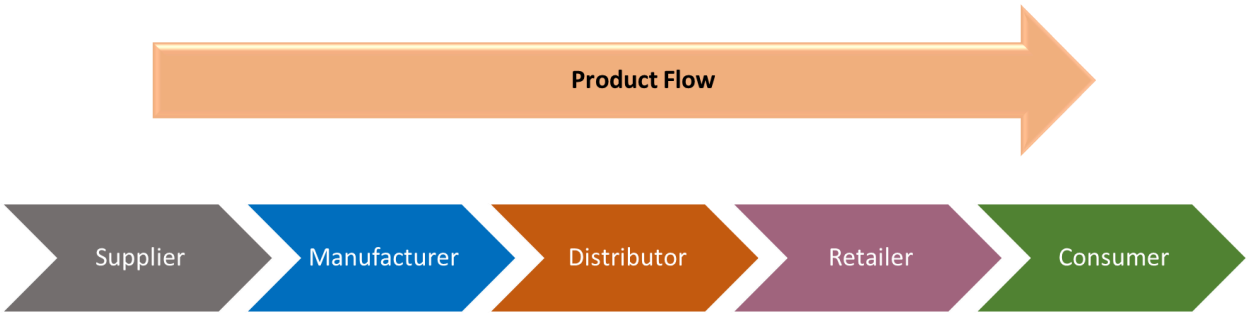
3. **How Supply chain start from Consumer?**
    a. The simple answer is that before starting any business, we all first estimate market size.The market size is nothing but customer demand.
    b. We set up everything in the backend after estimating the customer demand and that's why the supply chain starts from the customer and ends at the customer after fulfilling the demand.

4. Supply Chain Flow

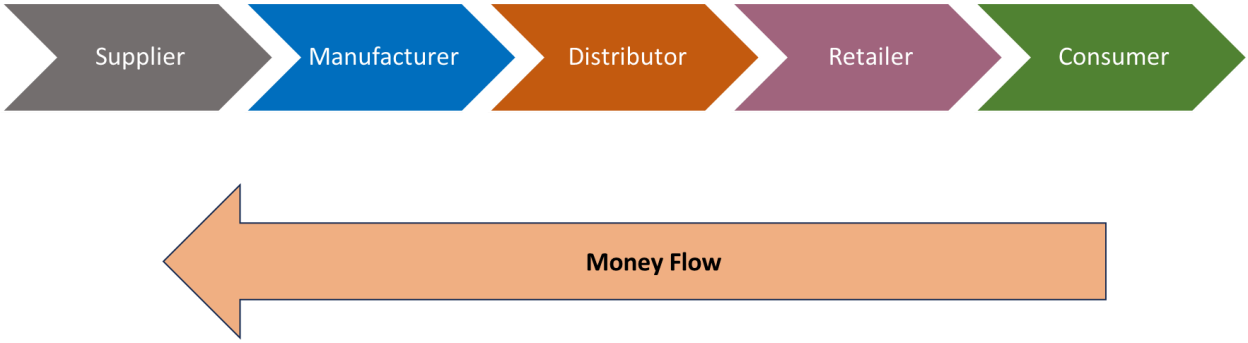
a. Data/Information Flow:



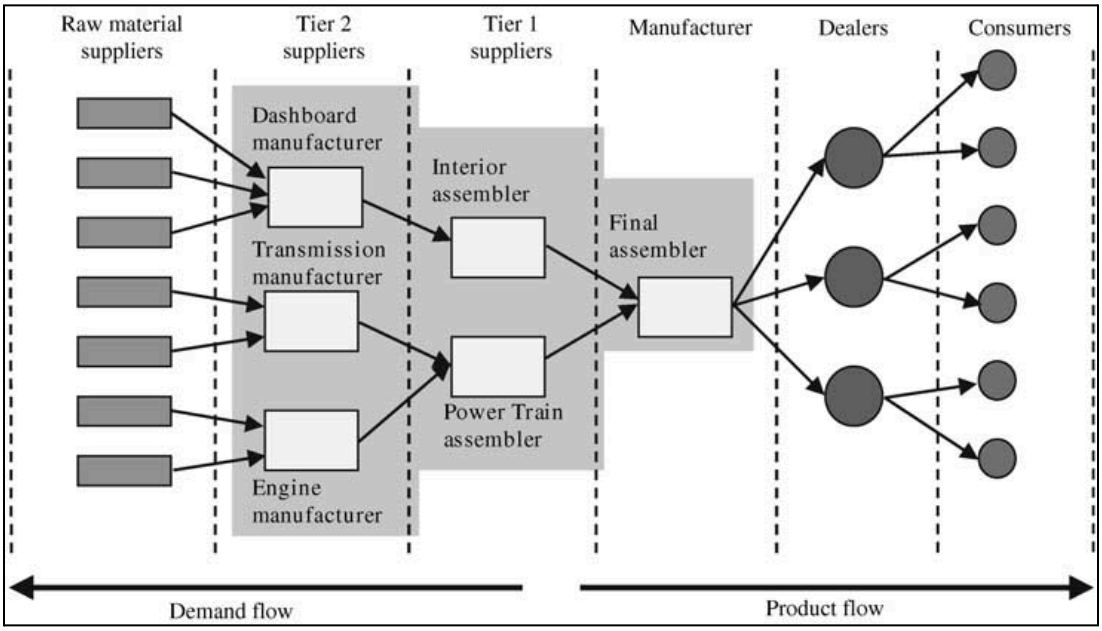
b. Product Flow:



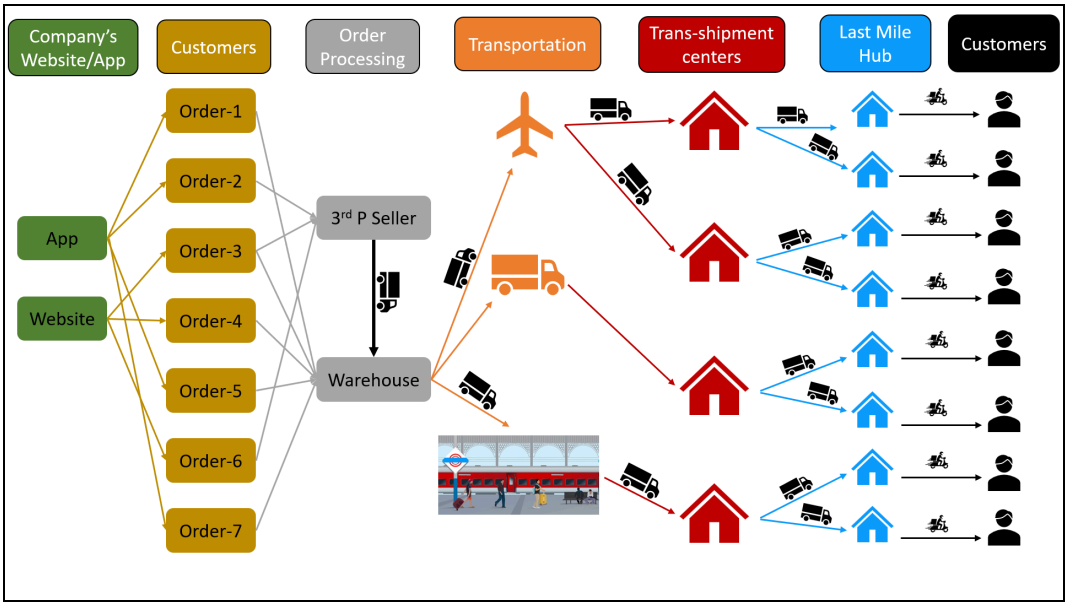
c. Money Flow:



5. **Supply Chain Example**
   a. Zara Supply chain - [Zara]
   b. Automotive Supply chain



   c. **E-Commerce Supply Chain**

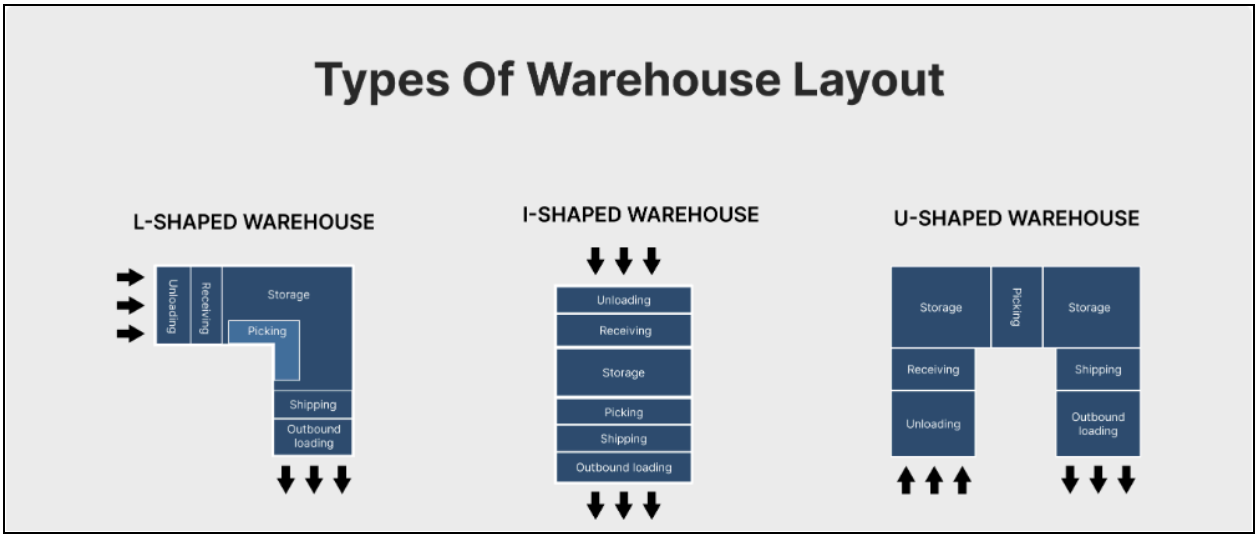


Warehouse

- ➔ A warehouse is a building/godown for storing goods.
- ➔ Warehouses are used by suppliers, manufacturers, distributors, wholesalers at different stages of the supply chain to store raw materials, semi-finished goods (parts) and finished goods.

Warehouse Layout

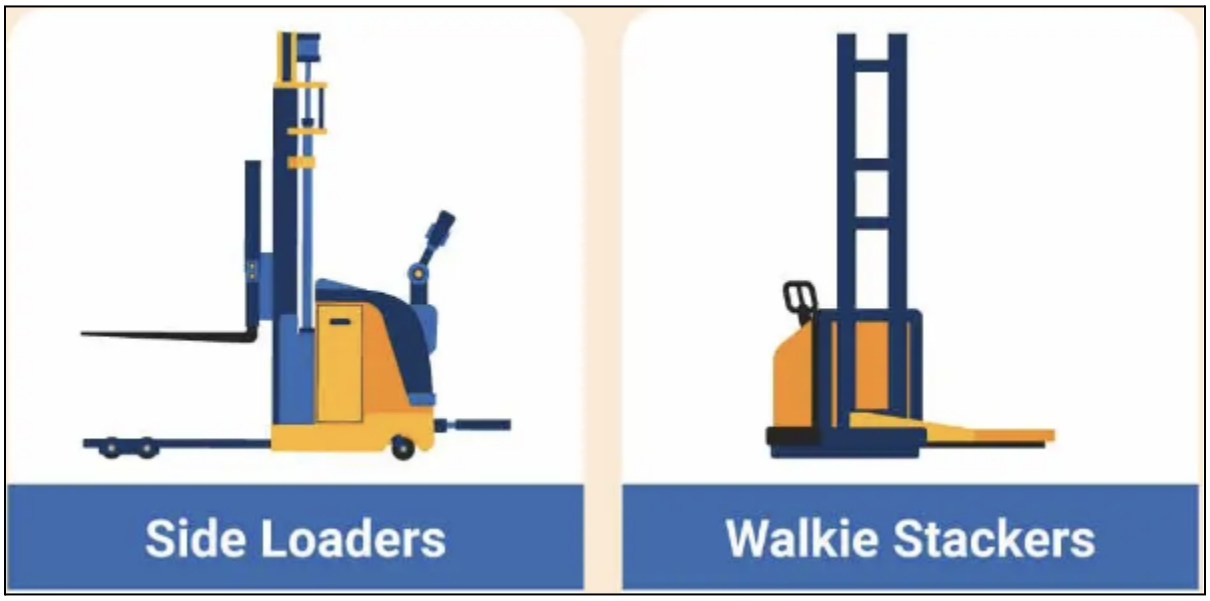
- ➔ **Dock Area** - An area where goods vehicles are loaded and/or unloaded.
- ➔ **Staging Area** - An area where the incoming goods are reviewed, verified & sorted before proceeding with final storage.
- ➔ **Storage Area -** This is the area where goods are stored for a longer time before getting picked for dispatch.
- ➔ **Packing Area -** This is the area where goods are consolidated (clubbed) before being shipped.
- ➔ **Dispatch Area -** The area where goods are kept after packing before being actually shipped.



Storage & Handling Equipments

- ➔ **Bins and Drawers -** Help maximize vertical storage space
- ➔ **Mezzanines -** Increase the available storage and workspace
- ➔ **Pallets -** Allow operators to move several products in fewer trips
- ➔ **Pallet stacking Frames -** Conserve floor space and help prevent products from being knocked down.
- ➔ **Storage Containers -** Provide more storage space and help transport items
- ➔ **Storage Racks -** Increase storage efficiency and organization

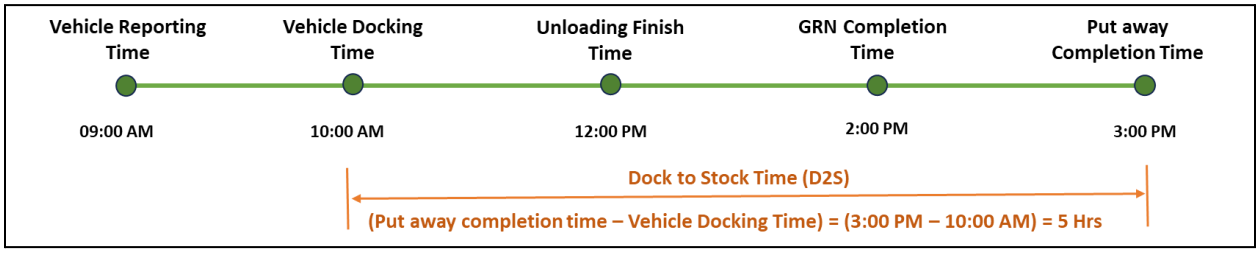
- ➔ **Forklifts -** Move and transport loads more efficiently.
- ➔ **Order Pickers** - Can lift the operator to an elevated rack to pick orders.
- ➔ **Pallet Jacks** - Allow operators to transport materials in tight & small spaces
- ➔ **Side Loaders** - Allows operators to drive alongside racks and unload material without having to turn
- ➔ **Walkie Stackers** - Similar to a forklift, but the operator walks behind the machine instead of riding in a cab



Warehouse Activities

- ➔ **Inbound Operations:**
  - ➔ **Yard Management -** The process involves managing the flow of vehicles in the yard area outside the warehouse.
    - ◆ It involves optimum allocation of manpower to reduce the truck waiting time & TAT as per the vehicle arrival schedule.

- ➔ **Receiving -** This is the first step after the vehicle is docked at the dock area. It involves checking the necessary documents like Invoice, Purchase order (PO).
- ➔ **Unloading -** Once the documents are verified then goods are unloaded and kept in the staging area.
- ➔ **Quality Check -** We first verify the quantities received as per invoice.
  - ◆ We do random qc of 5-10% quantities as per set standard.
  - ◆ We classify the product as good or bad as per set qc rule.
- ➔ **GRN -** This is system related flow.
  - ◆ GRN stands for Goods Received Note
  - ◆ GRN (Accepted Qtys) = Received Qtys - Rejected Qtys
  - ◆ Accepted Qtys means Good Qtys (Saleable) as per QC report
  - ◆ Rejected Qtys means bad Qtys (Non-Saleable) as per QC report.
- ➔ **Putaway -** Once GRN is completed, a putaway sheet is generated along with location Ids.
  - ◆ Items are then moved to the designated location Ids with the help of available material handling equipment.
  - ◆ Scan the location with the help of HHD/HHT (Hand held device/terminal) to put required qty at the location.
  - ◆ Make the same entries in HHD/HHT.
  - ◆ Once the put-away is done, the stock gets live on the website for customer orders.
- ➔ **KPI/Metrics -**
  - ◆ **Dock to Stock Time (D2S)**
    - It measures the time taken to process a vehicle from the time it was docked till the stock gets live.
    - It is generally measured in Hrs.
    - The best in class is 2 Hrs, standard D2s time is 24 Hrs.
    - Average D2S time is somewhere between 24-48 Hrs.



➔ **Ad-hoc Inbound Operations:**

- ➔ **Stickering -** If the incoming material does not have any unique identity like EAN Code, SKU Code or having missing attributes then we need to label the products with the required attributes. This activity is called stickering.
- ➔ **Kitting -** If the incoming products require bundling as per the company's products offering then the process of bundling is called Kitting.

➔ **Outbound Operations:**

- ➔ **Picklist Generation -** This is system related flow. We generate a picklist by combining all pending orders at any given time reflecting in the system.
  - ◆ We generally create picklist SKU/product wise by combining all pending orders.
  - ◆ The logic of generating a picklist will vary with respect to industry & product type.
  - ◆ Output - Pick this SKU from this Location Id of this much quantities
    - SKU Name
    - Location Id
    - Qtys to be picked
- ➔ **Picklist Allocation -** Assign the picklist to the available pickers.
  - ◆ Pickers will open the HHD/HHT & go to the pick tab to start the picking activity
- ➔ **Order Picking -** The picker will go to respective location Ids as per assigned picklist and pick the required units as per picklist.
- ➔ **Packing -** Once the picking is completed then picked stock is arrived at the packing station to pack items as per customer order.
  - ◆ The system will generate a customer's order invoice to be packed along with the products/items. It's a regulatory requirement.
  - ◆ The system will generate a shipping label with a unique AWB number (Airway Bill Number) for every order to be pasted on the outer packaging box/flyers.
  - ◆ Shipping labels help in handing over the shipments to respective courier partners & tracking of the shipments at different stages of order's journey.
  - ◆ It helps courier partners to segregate orders as per defined zone/rule to further connect the shipments in the network for faster delivery.
- ➔ **Manifest -** This is a system flow to prepare dispatch copies/documents of different courier partners.
  - ◆ We generally require 4-5 courier partners for Pan India delivery service.
  - ◆ It's important to generate dispatch copies of every courier partner for an effective handover process between warehouse and courier partners.
  - ◆ Shipments belonging to same courier partners segregated and kept separately for smooth handover process.
- ➔ **Dispatch -** Handing over the shipments to the courier partners for delivery.
  - ◆ Each shipment will be scanned via HHD/HHT during the handover process.
  - ◆ The courier agents will sign the dispatch/manifest documents with the following details.
    - No. of shipments received
    - No. of shipments not handed over as per manifest

- Date & Time of receiving
- Name of the Courier Agent
- Name of warehouse agent
- Sign of warehouse agent

➔ **KPI/Metrics**

◆ **Order Processing SLA**

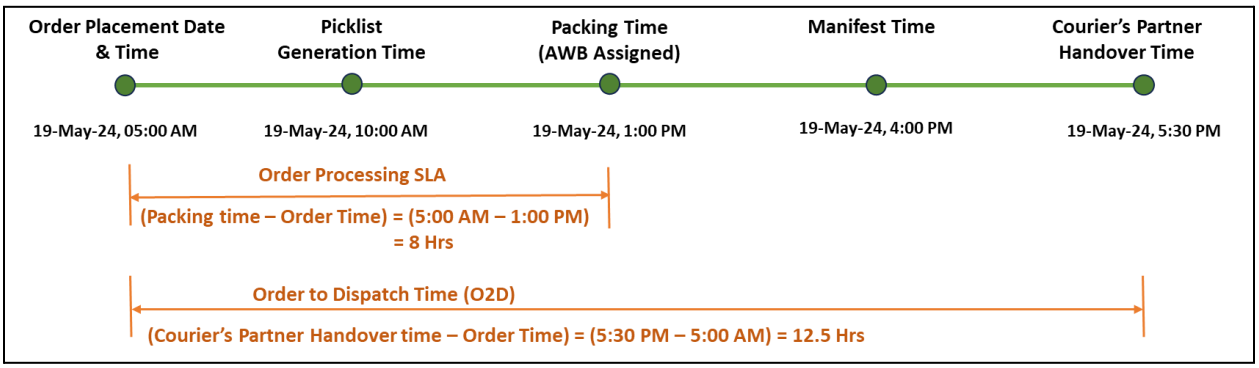
- It refers to the time duration between when an order is placed by a customer and when the order is fulfilled by the warehouse.
- Orders that require shipping are considered processed/fulfilled when the AWB is assigned to the orders i.e. packing is completed.
- Standard Order Processing SLA is 12 Hrs.

◆ **O2D Time**

- It refers to the time duration between when an order is placed by a customer and when the order is handed over to a courier partner for delivery.
- Standard O2D time is 24 Hrs.

◆ **Delivery SLA/TAT**

- It refers to the time it takes from a customer placing an order to them having it in their hands
- It's usually measured in Days.



➔ **RTO Processing:** The shipments rejected by the customer due to various reasons returned back to the origin i.e at a warehouse called RTO (Return to Origin).

- ➔ **Return Receiving -** Received the RTO shipments as per return document handed over by the courier agent.
  - ◆ Verify the RTO shipments with the system.
- ➔ **Quality Check -** It undergoes strict qc check to determine the condition of the items/products.
  - ◆ We classify the products as saleable for qc passed items and non-saleable for failed qc items.
- ➔ **Restocking -** Based on the qc result, products/items are either restocked to designated location ids or disposed of if the product is damaged beyond repair.
- ➔ **KPI/Metrics**
  - ◆ **RTO Processing TAT**
    - It refers to the time duration between RTO receiving date at WH to the RTO put-away date.
    - It's usually measured in days.
    - The standard TAT is somewhere between 3-5 Days.

- ➔ **Inventory Cycle Count :** It's a daily activity set to be performed at a specific time to count a small proportion of available inventory to check the accuracy.
  - ◆ We need to plan cycle count activity in such a way that we count all location Ids inventories within specified days i.e. within 7 days, 15 days or 30 days.
  - ◆ Ideal cycle count completion time is 30 days.
  - ◆ Accuracy is measured as system quantity vs physical quantity.

- ➔ **Warehousing Cost :**
  - ◆ **Storage Cost -** The cost associated with space requirement to meet daily operation needs is called storage cost.
    - We generally rent out warehouse space as per our requirement instead of owning the warehouse as owning the warehouse will be a huge capital investment.
    - It's generally measured in Rs/Sq Ft
    - The rental cost varies location to location. You will find cheaper options far from the city limit.
  - ◆ **Manpower Cost -** The cost associated with manpower to carry out our daily warehouse operations.
    - There are different types of manpower skill requirements to carry out daily warehouse operations.
    - Warehouse manager, Facility manager, IT Manager, Assistant warehouse manager, Inventory manager, Team lead, MIS, Senior executive, Executive, pickers-packers, loaders/unloaders, security guards etc.
  - ◆ **Material Handling Equipment Cost -** The cost associated with different types of material handling equipment to support daily warehouse operations.
    - Pallets, Pallet jacks, Hand Trucks, Forklifts and others
    - We generally rent out material handling equipment per unit basis.

- **IT Cost -** The cost associated with IT & related equipment like WMS software, HHT/HHD, laptop, desktop, printing machine, wifi routers, wifi and others.
- **Overhead Cost -**
  - **Stationary/Office Supplies Cost** - Register, marker, pen, pencil, label, paper, tissue paper, soap, sanitizer, dettol, white board, first AID & others
  - **Housekeeping Cost** - We generally require manpowers to keep our warehouses clean every time as per hygiene requirements.
  - **Electricity Cost -** The cost of energy to ensure proper lighting, air circulation, running of IT equipment and material handling equipment.
  - **Water Cost -** The cost of drinking & general utility water.
  - **Daily Refreshment Cost -** Tea, coffee, biscuit & others
  - **Insurance Cost -** The cost of insurance to protect the property & stored stocks from any unwanted events like theft, flood, natural calamity.
  - **Diesel Cost -** We generally keep generators as a back-up for our electricity requirements in the event of power failure. Diesel cost is associated with generators.
  - **Pest Control Cost -**
  - **Equipment servicing cost -** Servicing cost is associated with repairing cost of mal-functioning equipment like AC, Generators, HPT (Hand Pallet Truck), forklifts etc.

➔ **Warehousing cost structure of 3P Service providers**

- **Storage Cost -** Different 3rd party warehousing partners will charge differently when it comes to storage cost.
  - **Rs./Item/Day** - Storage cost will be charged as per number of items kept/available in the warehouse on a daily basis.
    - Convert it into a monthly basis while calculating monthly storage cost.
  - **Rs./CFT/Month** - Storage cost will be charged as per Sq Ft required to store inventories on a monthly basis.
    - The above costing structure is standard & followed by most service providers
  - **Rs./Bin/Month** - Storage cost will be charged as no. of Bins required to store the inventories on a monthly basis.
  - Calculate total count of items to be stored/required CFT space/total number of bins required to store items to compute storage cost.
  - D2C brands generally keep somewhere between 30-60 days based on DRR, manufacturing lead time, transportation lead time and safety stock.
  - Standard days of inventory is 60 days and we can assume the same for this project.
- **Inbound Cost -** Inbound cost includes unloading, QC, GRN & put-away cost.
  - 10% QC of incoming stocks only included in inbound cost as a standard practice followed by 3rd party service providers.

- If we want to do 100% qc of incoming stocks then it will be charged separately and will be mentioned as separate cost elements in quotation and agreement.
- **QC cost** is charged per item basis if opted for 100% quality check.
- If loading/unloading cost is mentioned as separate cost elements then consider it while calculating inbound cost.
- Unloading cost is charged per Box basis.
- **Rs.Items** - Inbound cost is charged per item basis & mostly followed by every 3rd party service provider.

◆ **Ad-hoc Inbound cost -**

- **Stickering cost** will be charged per item basis.
- **Kitting cost** will be charged per kit basis meaning how many kits were made.

- ➔ **Outbound Cost -** It includes picking, packing, shipping label & invoice printing & pasting and dispatch activity.
  - ◆ It's generally calculated per item basis (in Rs) & standard for all 3rd party service providers.
  - ◆ To give some kind of benefits by service providers, they will split the charges for first item & add-on items in an order.
  - ◆ If invoicing/documentation cost is mentioned as a separate cost element in contract/quotations then consider it as part of outbound cost.
  - ◆ Do not consider loading cost as part of outbound cost for B2C vertical as shipments are directly picked up by courier partners due to very less weight per shipment basis (0.25 Kg to 1 Kg) & do not require dedicated manpower to load the vehicle.
  - ◆ While calculating outbound cost for B2B/RTV/STN
    - Include order processing (Picking + Packing + Dispatch) and loading cost
    - Ignore invoicing/documentation cost as we require a single invoice in this type of transaction.

- ➔ **RTO Processing cost -** It includes RTO receiving, verification & quality check, classifying into saleable/non-saleable and then put-away activities.
  - ◆ It's calculated as per item basis only.
  - ◆ Do not consider separate qc cost while calculating RTO processing cost as it's already included in the RTO cost element.
  - ◆ It's a standard practice that 100% quality checks are required before inwarding any RTO stocks. It's followed by every service provider.
- ➔ **Other Cost**
  - ◆ **Holiday Working cost** - Sunday/public holidays like Holi, 2nd october, Diwali, 1st January etc is considered as holiday & general warehouse is closed.
    - If we want the warehouse to be operational on these days then we need to pay additional cost as per cost elements mentioned in quotation/agreement copy.
  - ◆ **Additional Manpower cost -** It includes additional manpower used to support any surge in demand due to festive season sales, carryout any additional activity apart from regular warehouse operation.
    - It's generally measured manpower requirement on a daily basis.
  - ◆ **Packaging Material Cost -** The cost associated with packaging material used during order packing activity is called packaging material cost.
    - It's generally charged at actual expense by the service provider.

Warehouse Management System (WMS)

- ➔ WMS is a software/application to manage & streamline warehouse operations, enhance accuracy & optimize end-to-end order fulfillment journey.
- ➔ WMS provides unparalleled visibility of every activity happening in the warehouse, from the moment a product enters the warehouse until it is shipped to the end customer.

- ➔ It helps with the following features in general.
  - ◆ Warehouse layout
  - ◆ Order management
  - ◆ Inventory management
  - ◆ Task management
  - ◆ Reporting & Analytics

Important Terms

- ➔ **B2C -** Business to Consumer : Traditional/conventional model serving the customer.
  - ◆ Manufacturer - Distribution Centre - Distributor - Wholesale - Retailer - Consumer
- ➔ **D2C** - Direct to Consumer : Directly reaching to consumer by eliminating middle men.
  - ◆ Manufacturer - Company's warehouse - Consumer
- ➔ **B2B** - Business to Business :
- ➔ **RTV** - Return to Vendor : Quality failed stock returned back to the supplier/vendor
- ➔ **STN** - Stock Transfer Note : Stock transfer within company's entities
  - ◆ Transfer of stock from one warehouse to another warehouse
- ➔ **DRR -** Daily Run Rate **:** Important metric while calculating any future projection demand.
  - ◆ This represents the average number of units you expect to sell or use per day.
- ➔ **UOM** - Unit of Measurement
- ➔ **HHD/HHT -** Hand Held Device/Terminal - To digitize warehouse ops.
- ➔ **Agreement/Contract -** An agreement is a legal business document that defines the terms & conditions, guidelines, rate card, scope of work, penalties, payment terms and other necessary information in detail for a particular service between two parties.

- It's made & signed by both parties upon reaching a conclusion.
- Any future dispute will be handled by referring to the signed agreement copy.

➔ **Quotation -** It's just a reference document shared by the service provider based on the business volume discussion. It's an early stage of agreement.

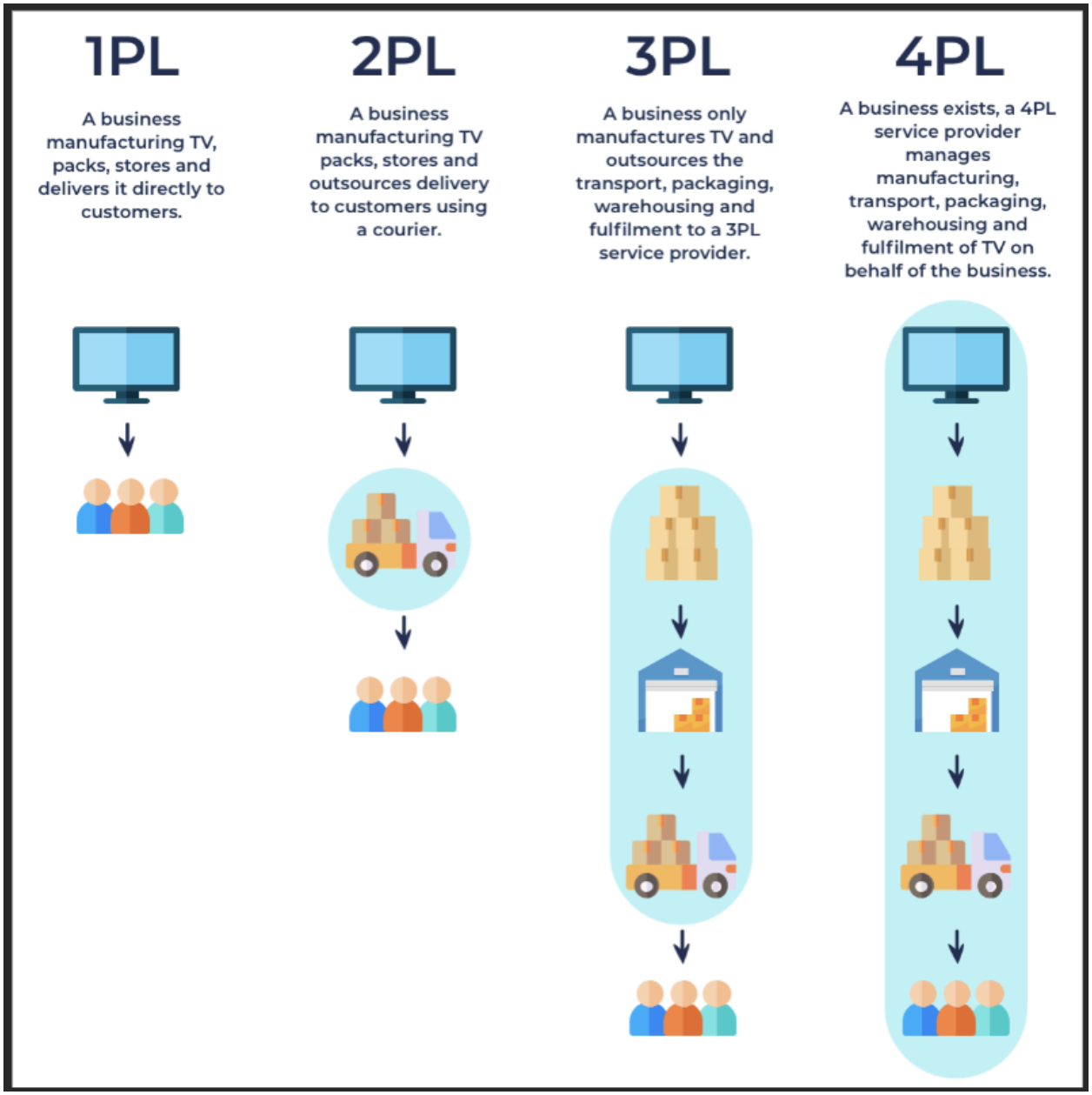
- When we identify a service provider or a service provider reaches to us for a particular service then we basically get an understanding of each other's businesses and volume of businesses.
- Based on the business volume, the service provider shares the quotation.
- The quotation will be checked and verified to suit the business requirement.

➔ **Benchmarking -** The process of measuring key business metrics & practices and comparing them with industry standards or competitors around the world.

➔ **3PL Service Provider (3PL) -** When a company/business outsources its warehousing & fulfillment of products to an external warehousing and/or logistics company/service provider which carries out these activities/processes efficiently on behalf of the company/business.

- Example - Amazon/Flipkart/Myntra is a 3PL logistics company.

- We may choose different service providers for warehousing & logistics as per business requirements.
  - 3PL warehousing company - AAJ Enterprises, warehousing express, warehouse now, stockarea, central warehousing corporation
  - 3PL Logistics company - Bluedart, Delhivery, DTDC, E-Com, Xpressbees.


1PL
A business manufacturing TV, packs, stores and delivers it directly to customers.
2PL
A business manufacturing TV packs, stores and outsources delivery to customers using a courier.
3PL
A business only manufactures TV and outsources the transport, packaging, warehousing and fulfilment to a 3PL service provider.
4PL
A business exists, a 4PL service provider manages manufacturing, transport, packaging, warehousing and fulfilment of TV on behalf of the business.

Why 3PL?

- ➔ **Significantly Lower Investments**
  - ◆ Contract warehousing is a great way to save cost as building/renting your own warehouse requires a huge fixed capital investment.
  - ◆ It's just like pay per usage when opting for 3PL.
- ➔ **Flexibility and Scalability in terms of volume based on demand**
  - ◆ Company requires different amounts of storage at different times during the growth journey.
  - ◆ Company requires a little space during inception and huge space after 2-3 years.
  - ◆ Company requires one warehouse during inception and 3-4 warehouses after 2-3 years.
  - ◆ 3PL warehousing companies will provide these flexibility & scalability with ease.
- ➔ **Price Stabilization**
  - ◆ The rate card related to services only changes on a yearly basis and hence brings price stabilization.
- ➔ **Excellent Service & Customized solution**
  - ◆ 3PL providers are industry experts with years of experience in the warehousing & logistics industry.
  - ◆ As a result, they offer customized solutions based on the business requirements like faster order processing TAT, inventory management & tracking and others.
- ➔ **Latest technology**
  - ◆ **3PL** service providers invest heavily in the latest technology which makes the warehousing & logistics more efficient & cost-effective.

Video Tutorial Link

- ➔ **Warehouse Process**
- ➔ **DHL Warehouse**
- ➔ **Order Processing**