ΧΑΡΟΚΟΠΕΙΟ ΠΑΝΕΠΙΣΤΗΜΙΟ
HAROKOPIO UNIVERSITY

Supply Chain Management

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Supply Chain Distribution

Supply Chain Flows

Flow of information, material/ product and funds

A SC is dynamic and the supply chain stages are connected through the flow of products, information, and funds. These flows often occur in both directions and may be managed by one of the stages or an intermediary.

The Value Chain Processes Strategy

Product development strategy specifies the portfolio of new products that a company aims to develop.

Marketing and sales strategy specifies how the market will be segmented and how the product will be positioned, priced, and promoted.

Operations + Distribution + Service strategy = Supply Chain strategy

Strategic Fit

Strategic fit leads to a company's success.

Strategic fit means

- ✓ competitive and supply chain strategies have aligned goals.
- ✓ consistency between the customer priorities that the competitive strategy hopes to satisfy and the SC capabilities that the SC strategy aims to build.

A company may fail because of a lack of strategic fit or because its processes and resources do not provide the capabilities to execute the desired strategy.

Failure at any one value chain's process may lead to failure of the overall chain.

The Value Chain Processes Strategy

Product development strategy specifies the portfolio of new products that a company aims to develop.

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Operations + **Distribution** + Service strategy = Supply Chain strategy

Supply Chain Distribution

Distribution: the steps taken to move and store a product from the supplier stage to the customer stage in a SC.

Distribution takes place between every pair of SC stages.

- ✓Product parts are moved from suppliers to product assembly centers.
- ✓Finished products are shipped from wholesalers to retailers.

Distribution = key driver of SC surplus, because it affects both cost and customer satisfaction/ experience.

SC Distribution Objectives

High product/ service availability to the customers

High customer service level to satisfy customer requirements

Balanced cost vs. effectiveness

Flexible distribution networks

SC Distribution Network Performance

Two SC Distribution Network Performance metrics:

- Customer service (meeting customer needs)
- SC costs to satisfy customer needs

SC Distribution Network design scenarios are assessed in terms of accomplished customer service and required costs to reach this service level.

SC Distribution Network Performance

Customer service

- ✓Product availability and variety
- ✓Response time
- ✓Customer satisfaction/experience
- ✓Order visibility
- ✓Time to market
- ✓Returnability (Post-sales service)

SC costs (i.e. Inventory, Facilities and handling, Transportation and Information costs)

SC Distribution Network

A set of interdependent organizations (intermediaries) involved in the process of making a product or service available for use or consumption by the consumer or business user.

When distribution strategy fails

88-year-old department store British Home Stores (BHS) lost 164 stores and about 11,000 employees over the same period due to years of under-investment and failing to adapt its retail operations to the changing trends. BHS did not offer shoppers the opportunity to buy products online and pick them up in-store despite the increasing adoption of this service by competing retailers.

Operations + **Distribution** + Service strategy = Supply Chain strategy

Deciding the SC Distribution Network

2 key decisions

Will the product be delivered to the customer location or picked up from a predetermined site?

Will product flow through an intermediary (or intermediate location)?

Deciding the SC Distribution Network - Customers

Type (Needs, Demands)

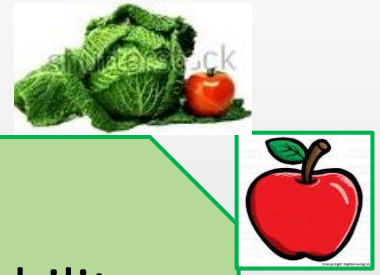
Number of potential customers

Geographic concentration

Order size

Deciding the SC Distribution Network - Product

Unit Value



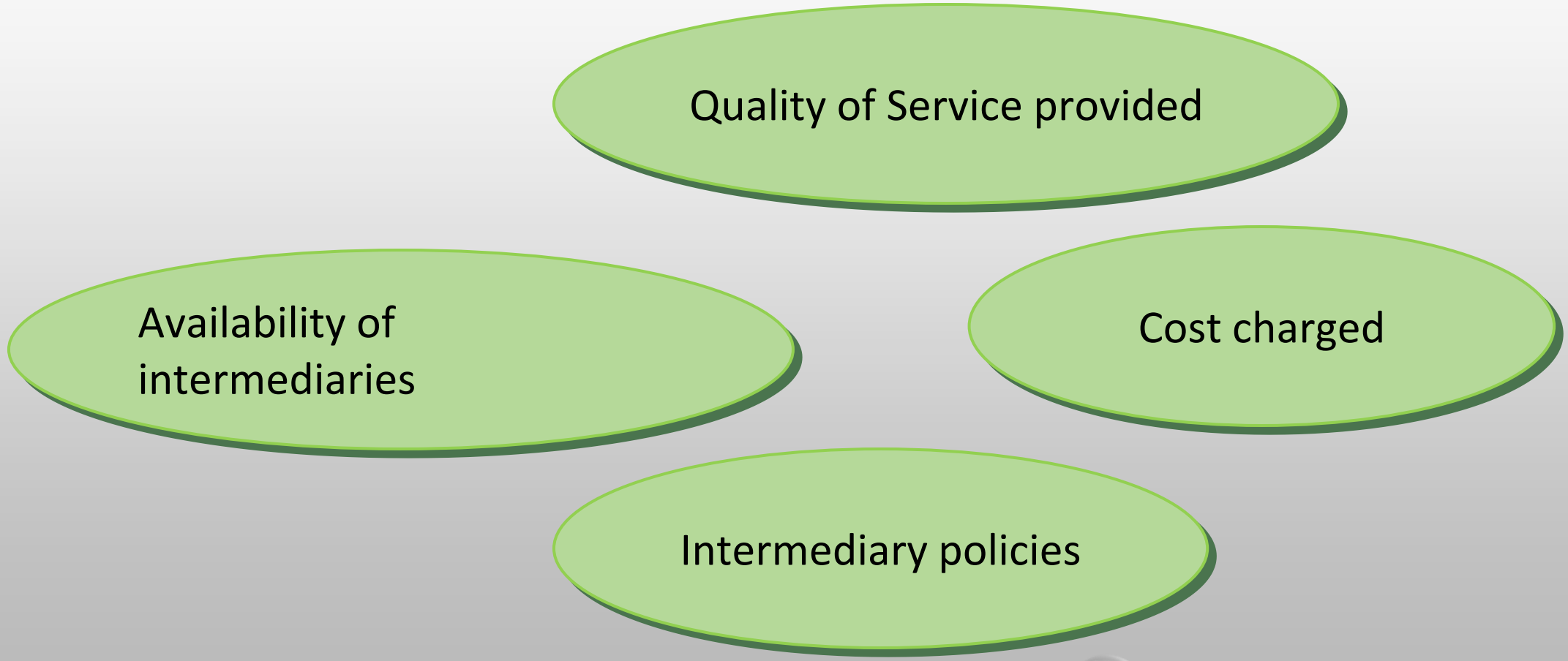
Perishability

Obsolescence

Technical Nature

Demand

Deciding the SC Distribution Network - Intermediary



Deciding the SC Distribution Network - Firm

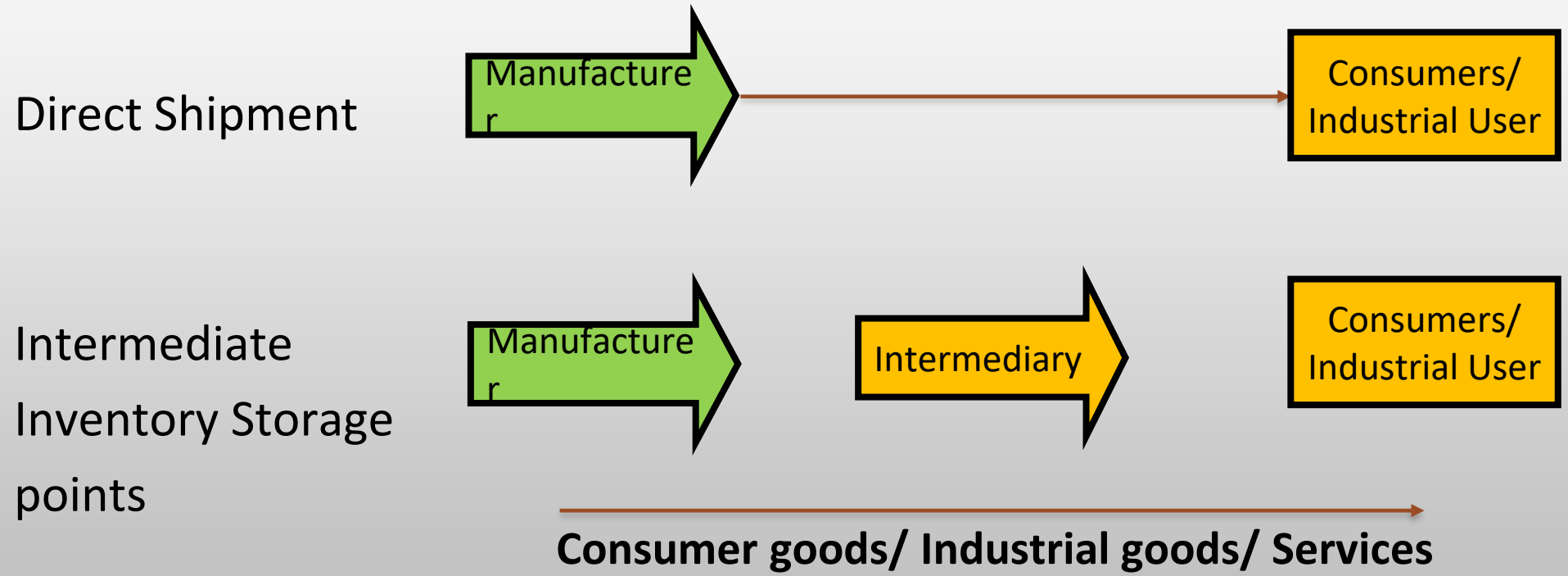
Wants to control distribution network

Service provided

Management ability

Financial resources

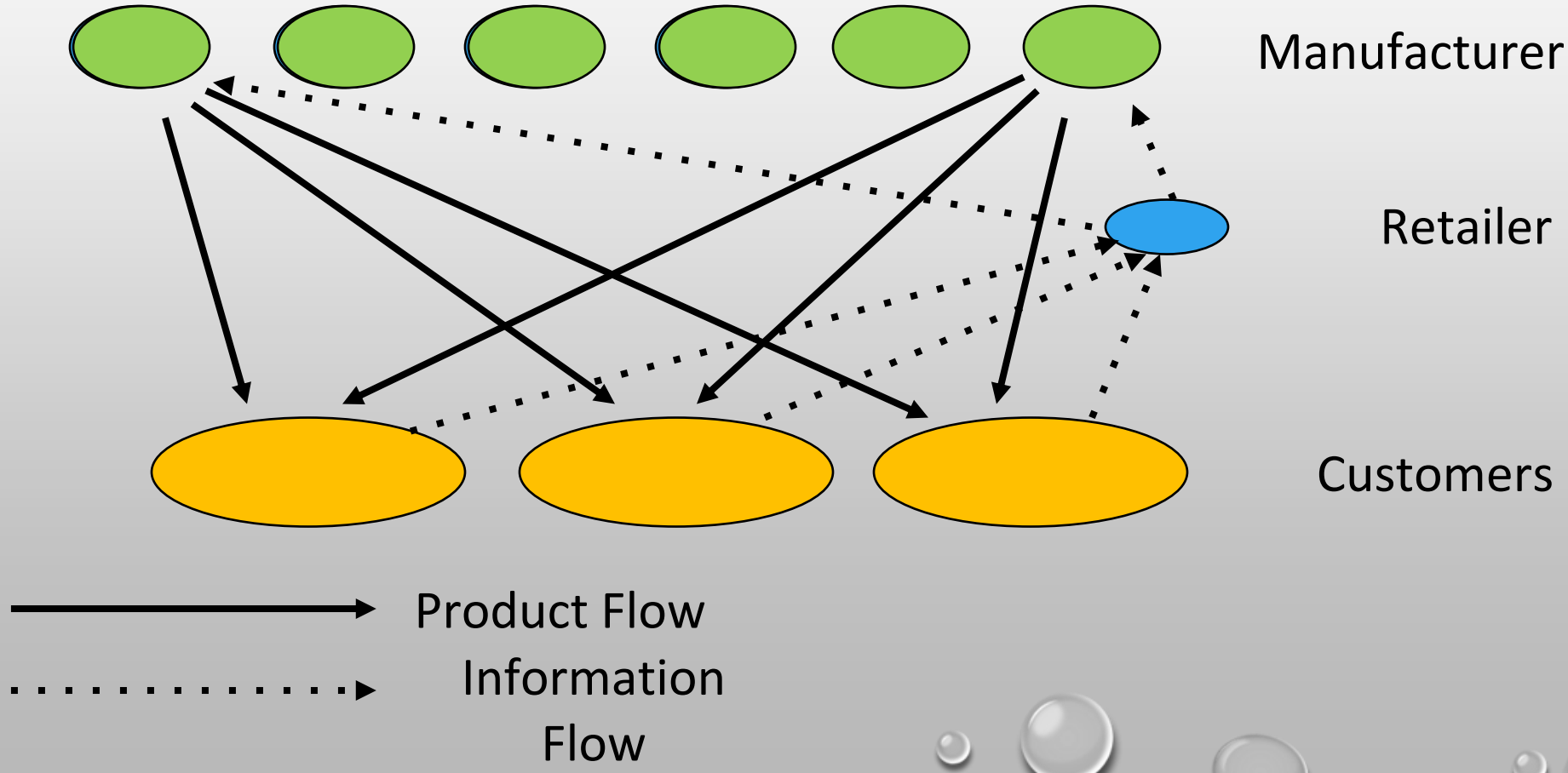
SC Distribution Network Strategies



SC Distribution Network Strategies

1. Manufacturer Storage with Direct Shipping (Drop shipping)
2. Manufacturer Storage with Direct Shipping and In-Transit Merge
3. Distributor Storage with Carrier Delivery
4. Distributor Storage with Last-Mile Delivery
5. Manufacturer or Distributor Storage with Consumer Pickup
6. Retail Storage with Consumer Pickup

Manufacturer Storage with Direct Shipping (Drop shipping)



Drop shipping

Πχ. e-bay, amazon

Drop shipping

DROPSHIPPING

- 1 - The customer orders and pays you for the product.
- 2 - Only after you get the money from the customer will you pay the supplier to fulfill the order.
- 3 - The supplier ships the product directly to the customer.

CLASSIC

- 1 - You get the items from the supplier. You also pay them at this time.
- 2 - The customer orders and pays you for the product.
- 3 - You ship the order to the customer.

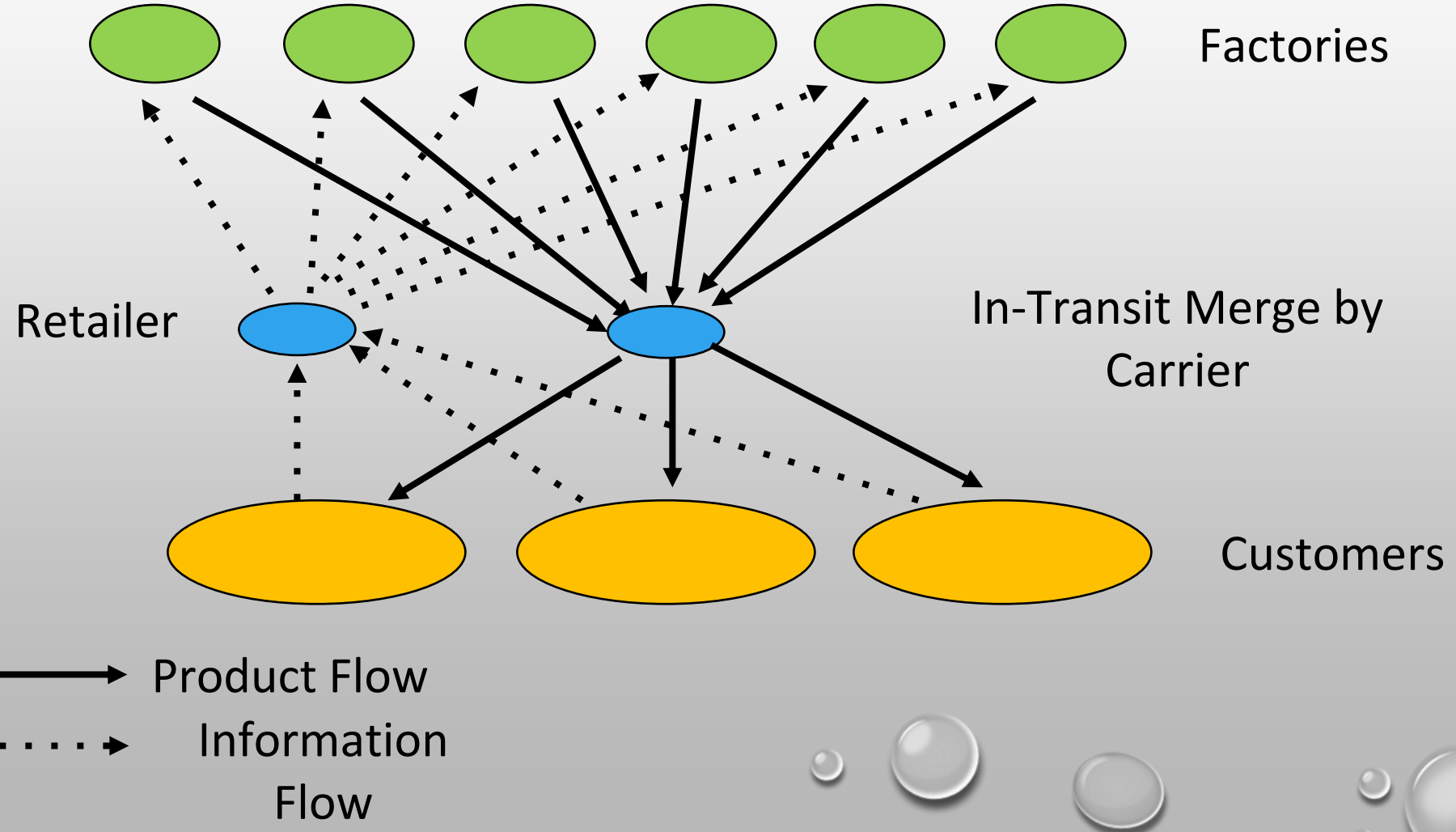
Drop Shipping

Cost Factor	Performance
Inventory	+ Lower costs because of aggregation. Benefits are highest for low-demand, high-value items. Benefits are large if product customization can be postponed at the manufacturer.
Transportation	– Higher transportation costs because of inceased distance and disaggregate shipping.
Facilities and handling	+ Lower facility costs because of aggregation. Some saving on handling costs if manufacturer can manage small shipments or ship from production line.
Information	– Significant investment in information infrastructure to integrate manufacturer and retailer.

Drop Shipping

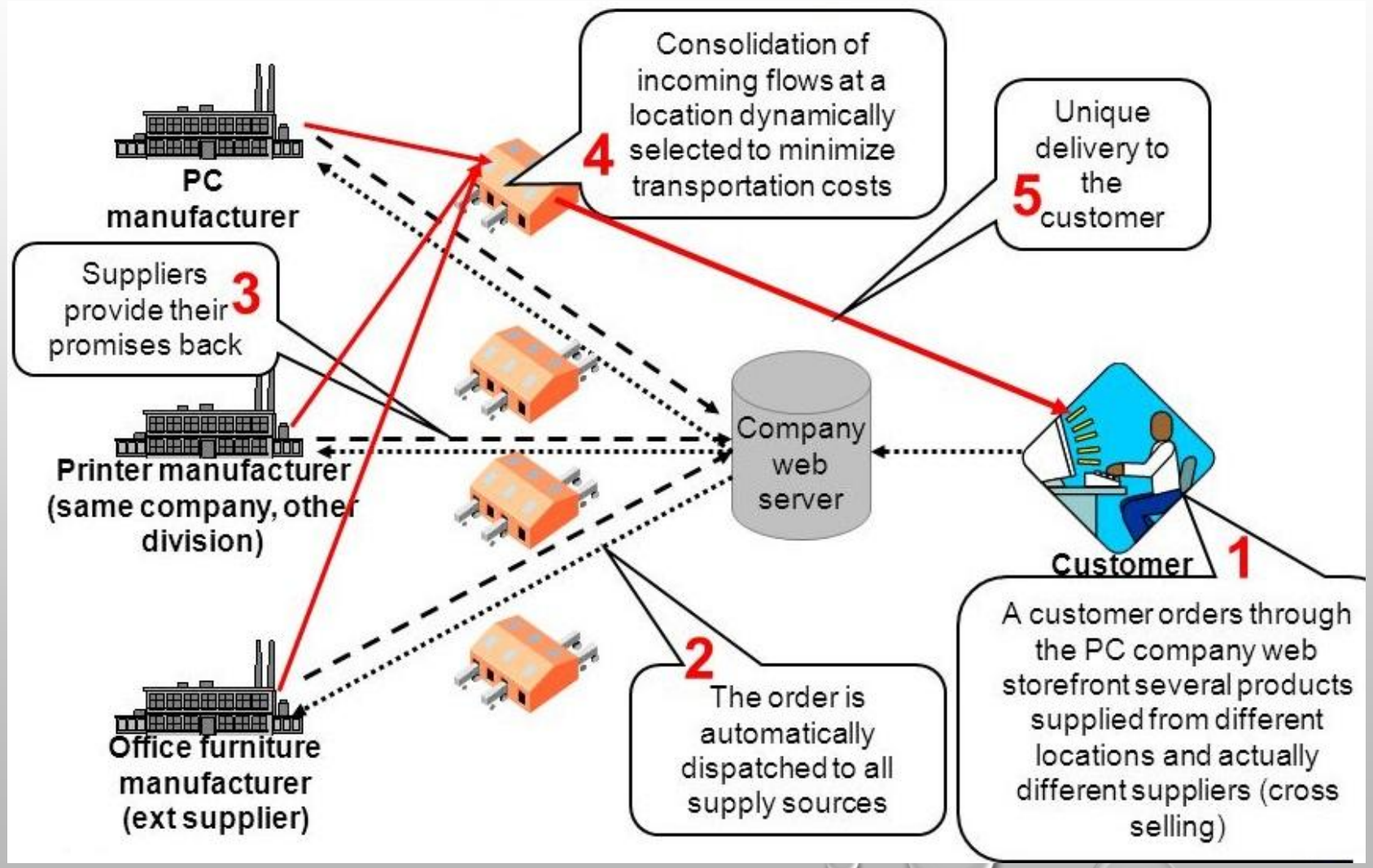
Service Factor	Performance
Response time	– Long response time of one to two weeks because of increased distance and two stages for order processing. Response time may vary by product, thus complicating receiving.
Product variety	+ Easy to provide a high level of variety.
Product availability	+ Easy to provide a high level of product availability because of aggregation at manufacturer.
Customer experience	+ Good in terms of home delivery, – but can suffer if order from several manufacturers is sent in partial shipments.
Time to market	+ Fast, with the product available as soon as the first unit is produced.
Order visibility	– More difficult but also more important from a customer service perspective.
Returnability	– Expensive and difficult to implement.

Manufacturer Storage with Direct Shipping & In-Transit Merge Network



Merge In-Transit (MIT)

Merge points replace Distribution warehouse centers



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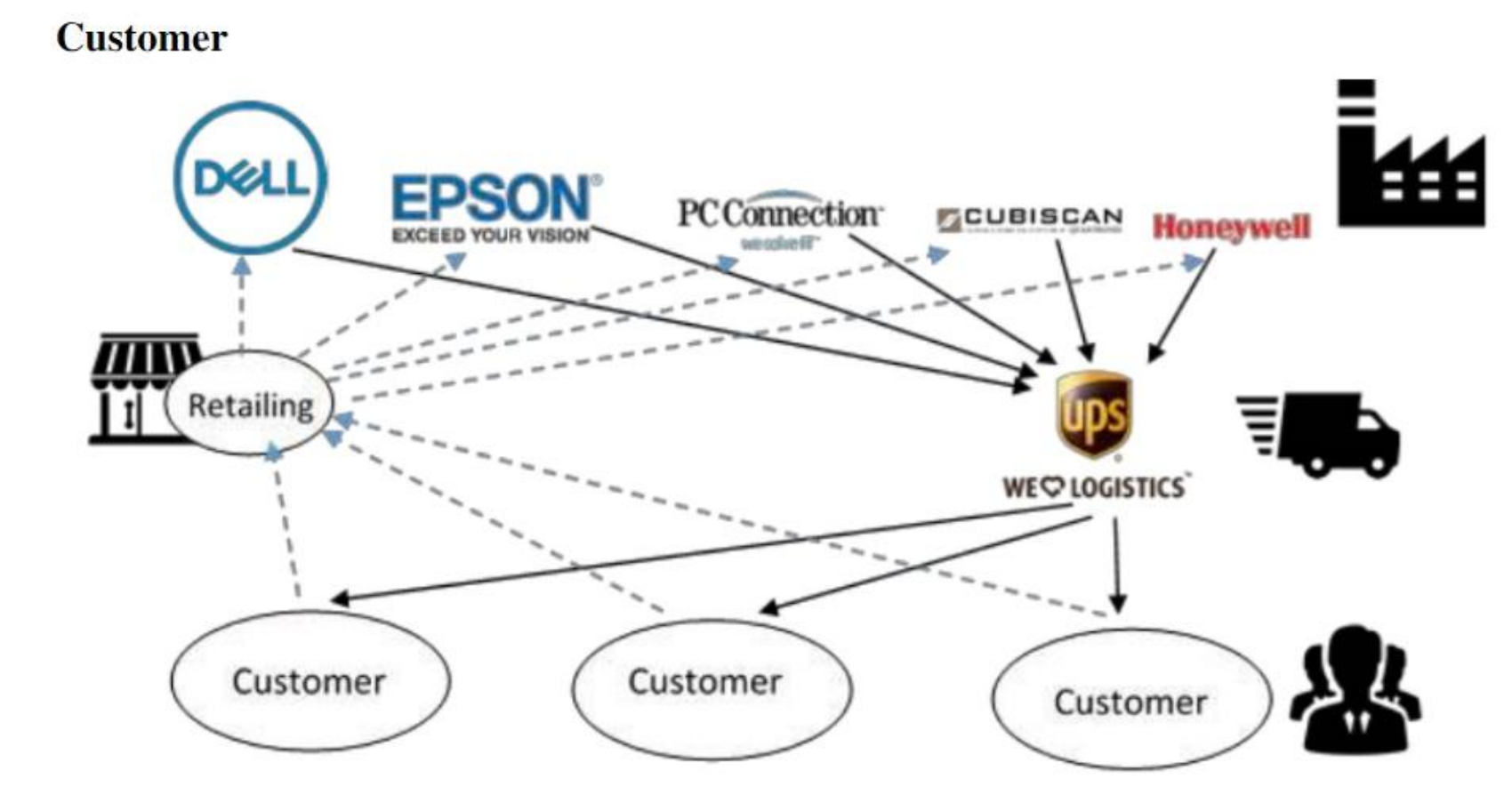


Merge In-Transit (MIT)

Cost Factor	Performance
Inventory	+ Similar to drop-shipping (Lower costs because of aggregation etc.)
Transportation	+ Somewhat lower transportation costs than drop-shipping.
Facilities and handling	+ Handling costs are higher than drop-shipping at carrier; receiving costs lower at customer.
Information	– Investment is somewhat higher than for drop-shipping.

Service Factor	Performance
Response time	– Similar to drop-shipping (long response time etc.); may be marginally higher.
Product variety	+ Similar to drop-shipping.
Product availability	+ Similar to drop-shipping.
Customer experience	+ Better than drop-shipping because only a single delivery has to be received.
Time to market	+ Similar to drop-shipping.
Order visibility	– Similar to drop-shipping.
Returnability	– Similar to drop-shipping.

Manufacturer Storage with …

Direct Shipping (drop shipping)	Direct Shipping and in-transit merge
Products are shipped directly to the consumer from the manufacturer.	Several pieces of the order coming from manufacturers/ suppliers originating at different locations are merged at a carrier hub and the customer gets one delivery.
Retailer collects the order information.	
Inventory is centralized at the manufacturer.	
Fits high value, low demand products with unpredictable demand.	No more then five product sources for best implementation.
Manufacturers can postpone customization. -> less inventory carried by manufacturers.	
High transportation costs	Lower transportation costs
	Better customer experience due to one single delivery

Merge in Transit example

Cisco collaborates with FedEx.

Before:

Sourced Parts of Cisco routers were stored in regional warehouses and, then, shipped to assembly facilities. Finished routers were held in Cisco warehouses and, then, shipped to the customers based on their orders.

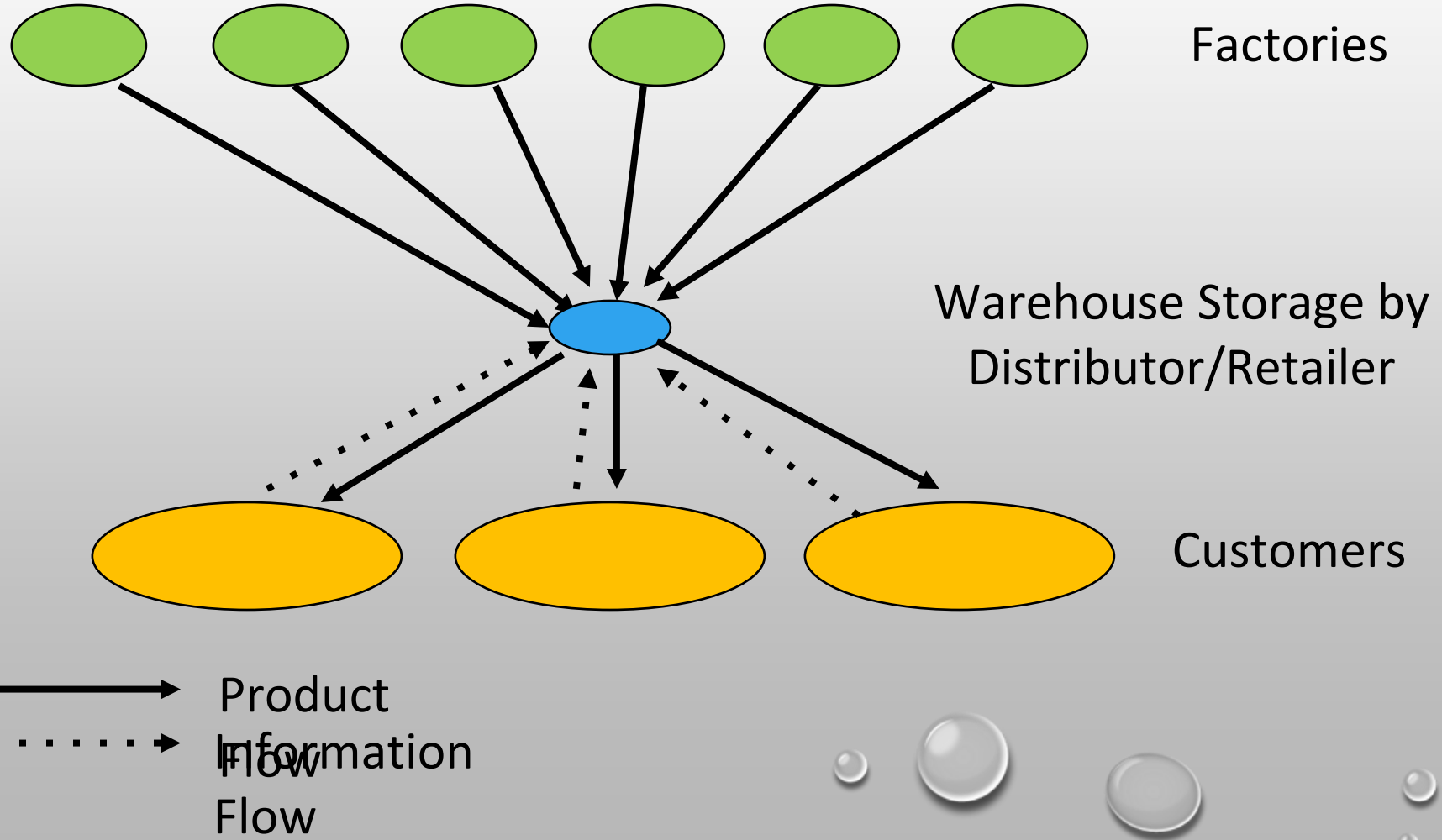
Inventory of parts and finished routers cost, facilities and transportation cost

Now:

FedEx provides a “Merge-In-Transit” point to Cisco. Based on the customer order, Cisco guides the suppliers to deliver the parts to the closest to the customer Fedex merge and assembly point. The router is assembled at the Fedex facility and, then, shipped directly to the customer.

Less inventory and transportation cost for Cisco and better customer service.

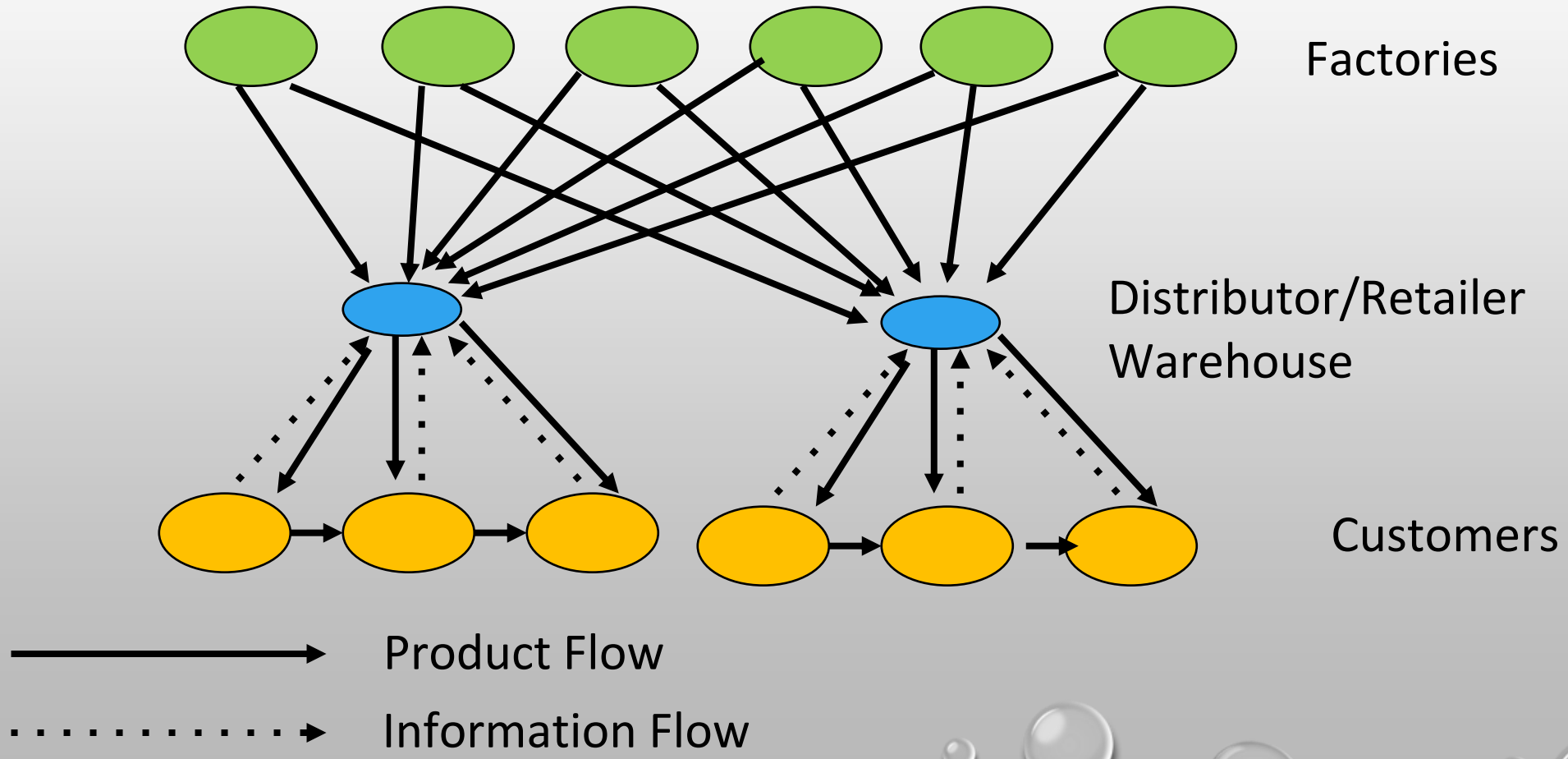
Distributor Storage with Carrier Delivery



Distributor Storage with Carrier Delivery

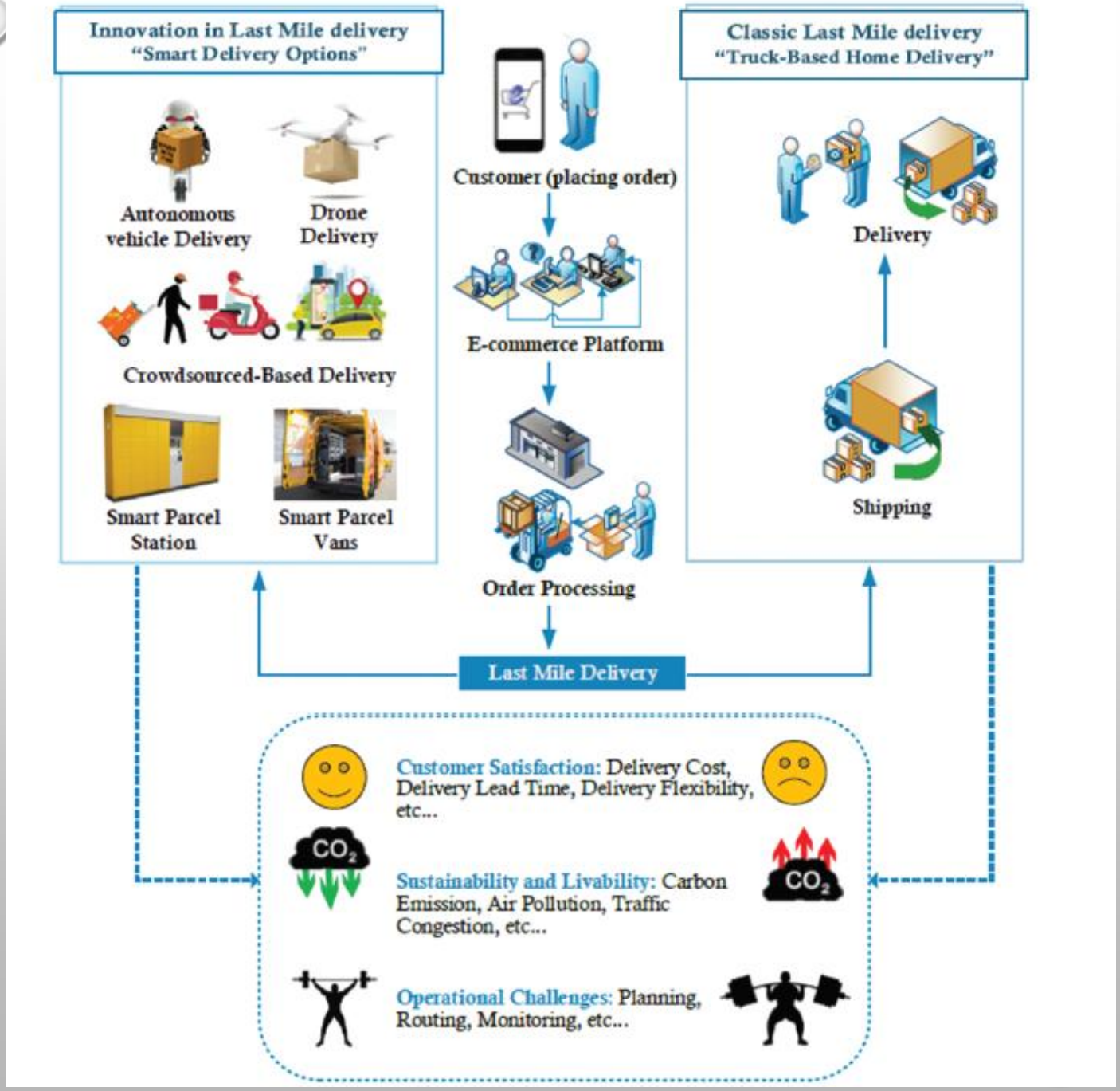
Cost Factor	Performance
Inventory	– Higher than manufacturer storage. Difference is not large for faster moving items but can be large for very slow-moving items.
Transportation	+ Lower than manufacturer storage. Reduction is highest for faster moving items.
Facilities and handling	– Somewhat higher than manufacturer storage. The difference can be large for slow-moving items.
Information	+ Simpler infrastructure compared to manufacturer storage.
Service Factor	**Performance**
Response time	+ Faster than manufacturer storage.
Product variety	– Lower than manufacturer storage.
Product availability	– Higher cost to provide the same level of availability as manufacturer storage.
Customer experience	+ Better than manufacturer storage with drop-shipping.
Time to market	– Higher than manufacturer storage.
Order visibility	+ Easier than manufacturer storage.
Returnability	+ Easier than manufacturer storage.

Distributor Storage with Last Mile Delivery



Distributor Storage with Last Mile Delivery

Cost Factor	Performance
Inventory	– Higher than distributor storage with package carrier delivery.
Transportation	– Very high cost given minimal scale economies. Higher than any other distribution option.
Facilities and handling	– Facility costs higher than manufacturer storage or distributor storage with package carrier delivery, + but lower than a chain of retail stores.
Information	+ Similar to distributor storage with package carrier delivery, – but it requires the additional capability of scheduling deliveries.
Service Factor	**Performance**
Response time	+ Very quick. Same day to next-day delivery.
Product variety	+ Somewhat less than distributor storage with package carrier delivery, – but larger than retail stores.
Product availability	– More expensive to provide availability than any other option except retail stores.
Customer experience	+ Very good, particularly for bulky items.
Time to market	– Slightly higher than distributor storage with package carrier delivery.
Order visibility	+ Less of an issue and easier to implement than manufacturer storage or distributor storage with package carrier delivery.
Returnability	+ Easier to implement than other previous options. – Harder and more expensive than a retail network.


Innovation in Last Mile delivery
"Smart Delivery Options"
Autonomous vehicle Delivery
Drone Delivery
Crowdsourced-Based Delivery
Smart Parcel Station
Smart Parcel Vans
Customer (placing order)
E-commerce Platform
Order Processing
Classic Last Mile delivery
"Truck-Based Home Delivery"
Delivery
Shipping
Last Mile Delivery
Customer Satisfaction: Delivery Cost, Delivery Lead Time, Delivery Flexibility, etc...
Sustainability and Livability: Carbon Emission, Air Pollution, Traffic Congestion, etc...
Operational Challenges: Planning, Routing, Monitoring, etc...

Last Mile Delivery - challenges

by 2050, around 6.3 billion people, i.e. approximately 70% of global population, will be living in big cities (Bretke 2013).

In 2018, e-commerce itself grew by 23.3% worldwide (Coppola 2021).

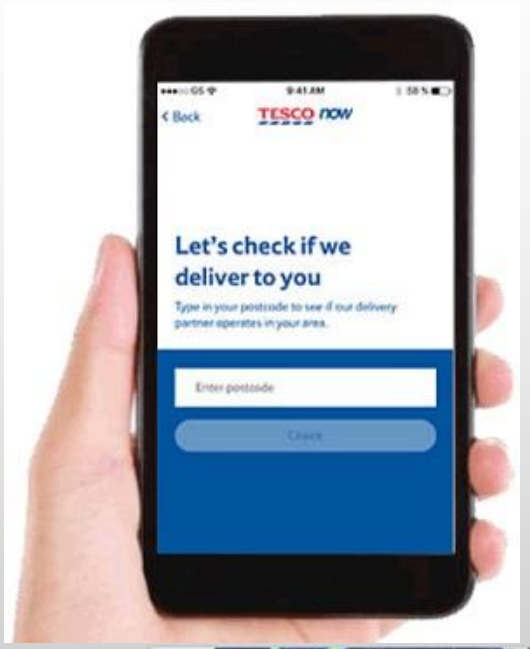
in Germany, in 2023, 4.4 billion parcels were delivered compared to the 1.69 billion shipments in the year 2000.

Amazon delivered approximately 6.5 billion parcels in 2022, compared to the 3.5 billion delivered in 2019.

Last Mile Delivery Example(1)

Tesco Now: new app-based, one-hour delivery service.

- They deliver up to 20 items to your door within 60 minutes from the time you place your order.
- Order from a variety of 1000 products.
- £7.99 a pop (or £5.99 for a two-hour delivery)
- Quiqup, a London-based delivery startup, handles the deliveries. Quiqup staff pick up the orders from Tesco stores.
- Only available in central London.



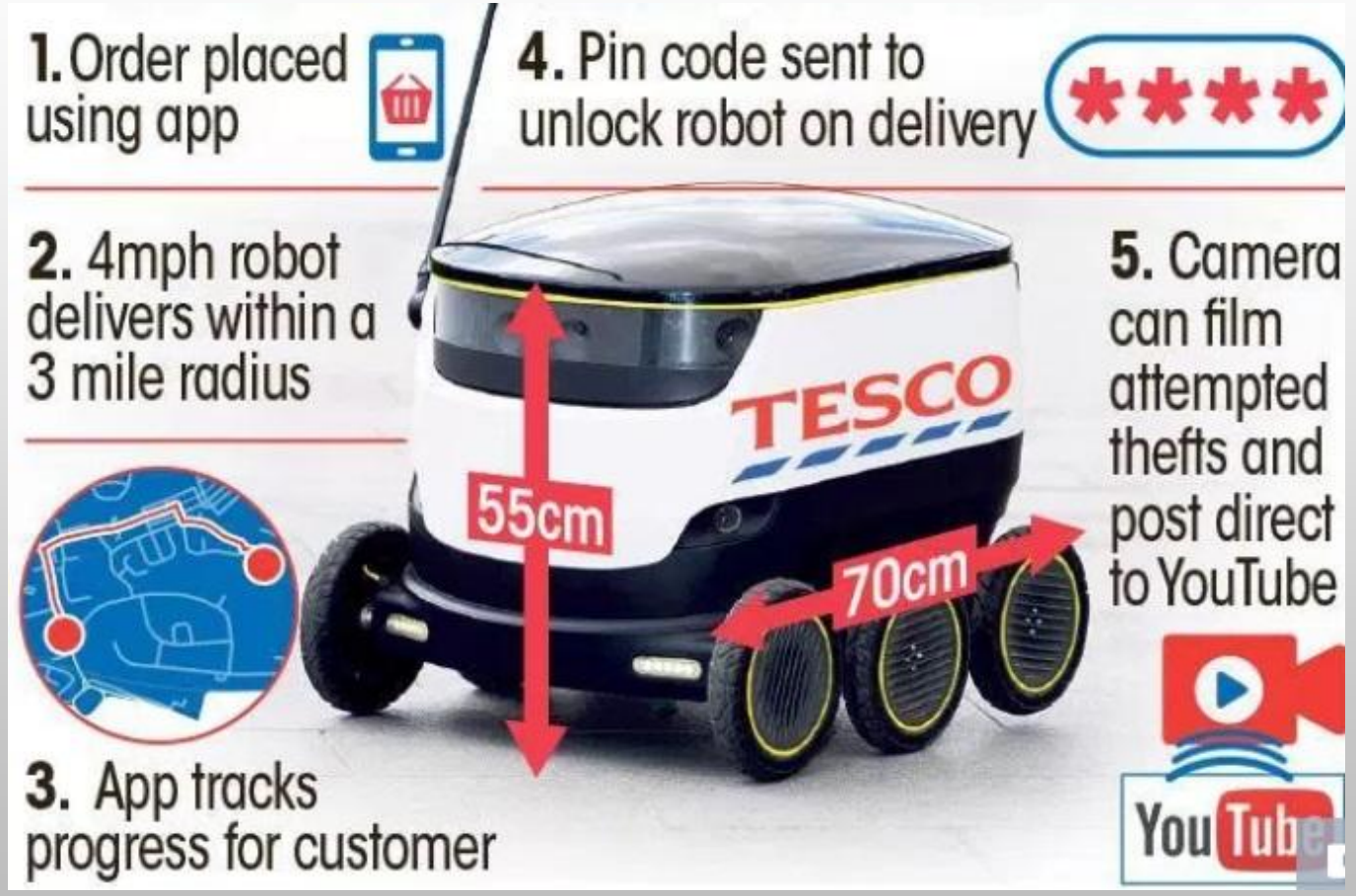
Tesco reacts to Amazon's Fresh online grocery delivery service in London, in 2016, with one-hour deliveries (Amazon Prime Now).

Last Mile Delivery Example(2)

- Tesco has made the first 2017 robot 1-hour delivery in London.
- Six-wheeled robot, made by Starship Technologies (Greenwich-based firm, launched in 2014).
- 4mph battery-powered robots carry items within a three miles radius of stores or delivery hubs.
- Customers track delivery progress using a smartphone.
- Robot is equipped with GPS technology, 9 cameras for mapping where it is going, and sensors for tackling obstacles, sensing traffic and navigating around pedestrians.
- Tesco is very pleased by the trial. It is considering a wider pilot later in 2017-2018, in London.

Last Mile Delivery Example(3)

self-driving autonomous delivery robots (ADRs)



Source: ROBOSHOP Tesco makes UK's first delivery by ROBOT in trial that could change shopping forever, the SUN, May 31st, 2017.

Last Mile Delivery Example

Starship Technologies has launched an app that allows users in Milton Keynes, UK to get their groceries delivered by its six-wheeled robots.

- Co-op retailer has extended the "robo-shop" to hundreds more households due to the demand.

- 8 in 10 households in the Milton Keynes area have downloaded the app to use the service, with pints of milk topping the shopping list of grocery items to order.

- For both Tesco and Co-op, you need to place your order using Starship Technologies' free app - you can't order via the Co-op or Tesco websites.
- £1 delivery charge on orders at both retailers but no minimum delivery spend.

Source:https://www.thesun.co.uk/money/8152853/tesco-co-op-testing-delivery-groceries-15-minutes/

self-driving autonomous delivery robots (ADRs)

Benefits in terms of Costs

- decreased operating cost - time efficiency
- Hoffmann and Prause [10] - cost of delivering one unit < 1 euro per delivery, 15 times less expensive than other delivery services
- Ostermeier et al. [28] - ADRs can reduce the last-mile delivery costs by up to 68% compared with regular truck deliveries.
- Truck deliveries vs local hub with robots (Bakach et al. [17]) - saving in operating costs of over 70%, and even greater in instances with customer delivery time windows
- Heimfarth et al. [22] - savings up to 43%.

https://link.springer.com/content/pdf/10.1186/s12544-023-00629-7.pdf

self-driving autonomous delivery robots (ADRs)

Benefits

- Reduced CO2
- Decreased congestion

Challenges

- Security – risk of theft
- Implementation cost

  Hiring a third-party logistics service provider using ADRs

- Speed of ADRs , Regulations, safety of people on the streets

Last Mile Delivery Software - SaaS

- Challenge: αξιοπιστία και εμπιστοσύνη στη last-mile παράδοση

- Solution: SW platforms που διαχειρίζονται και βελτιστοποιούν τη διαδικασία

- Ελληνικές λύσεις
  - *mynext.io* πελάτης - Cosmos Sport, η No1 ελληνική αλυσίδα πώλησης επώνυμων αθλητικών ειδών

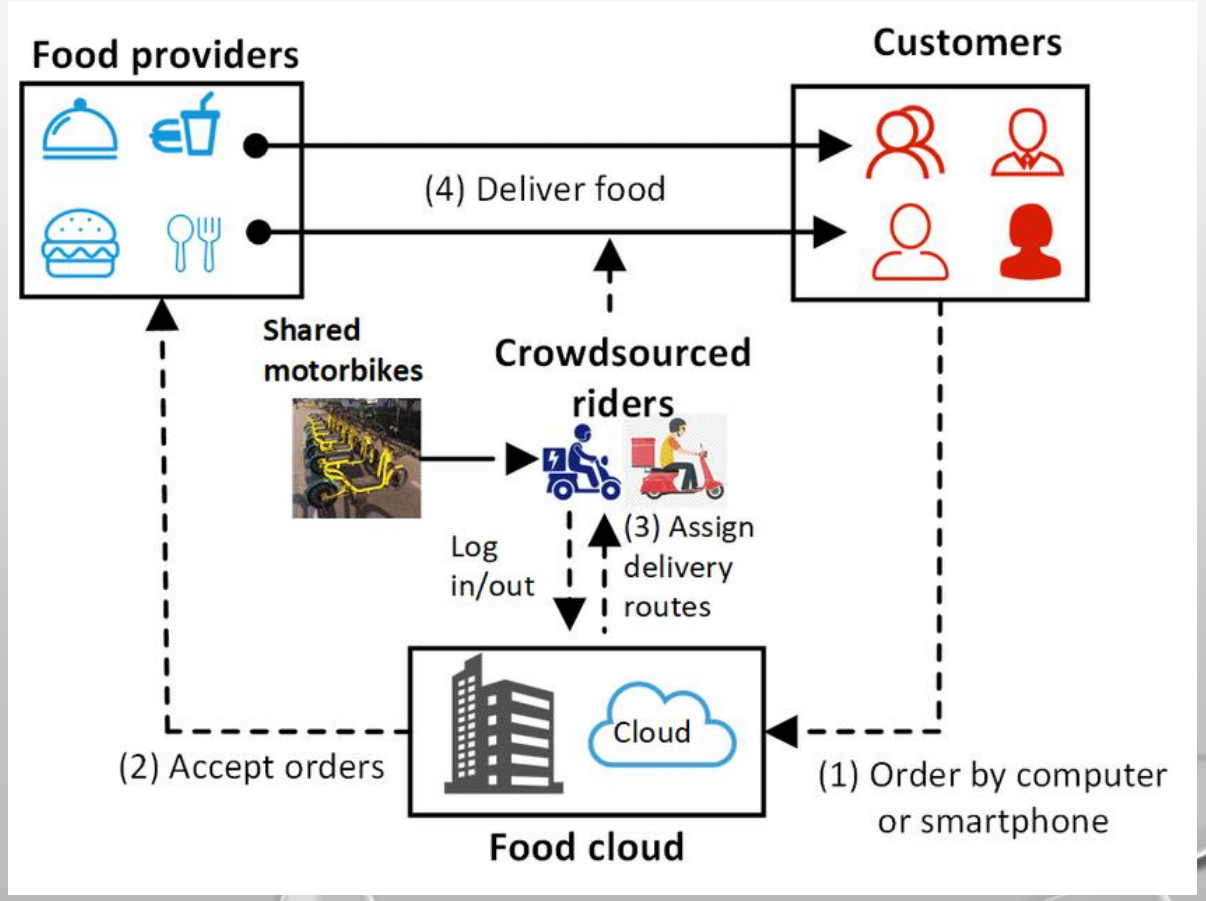
  - www.shiplemon.com

Crowdsourced last mile delivery/ Crowdsourcing Logistics

??????

Crowdsourced last mile delivery/ Crowdsourcing Logistics

- *a network of non-professional, local couriers (like Uber)*
- crowdsourced shippers
- Amazon Flex,
  - local couriers are paid based on the number of hours they work
  - work hours are flexible
  - They are not Amazon employees but partners.



Crowdsourced last mile delivery/ Crowdsourcing Logistics

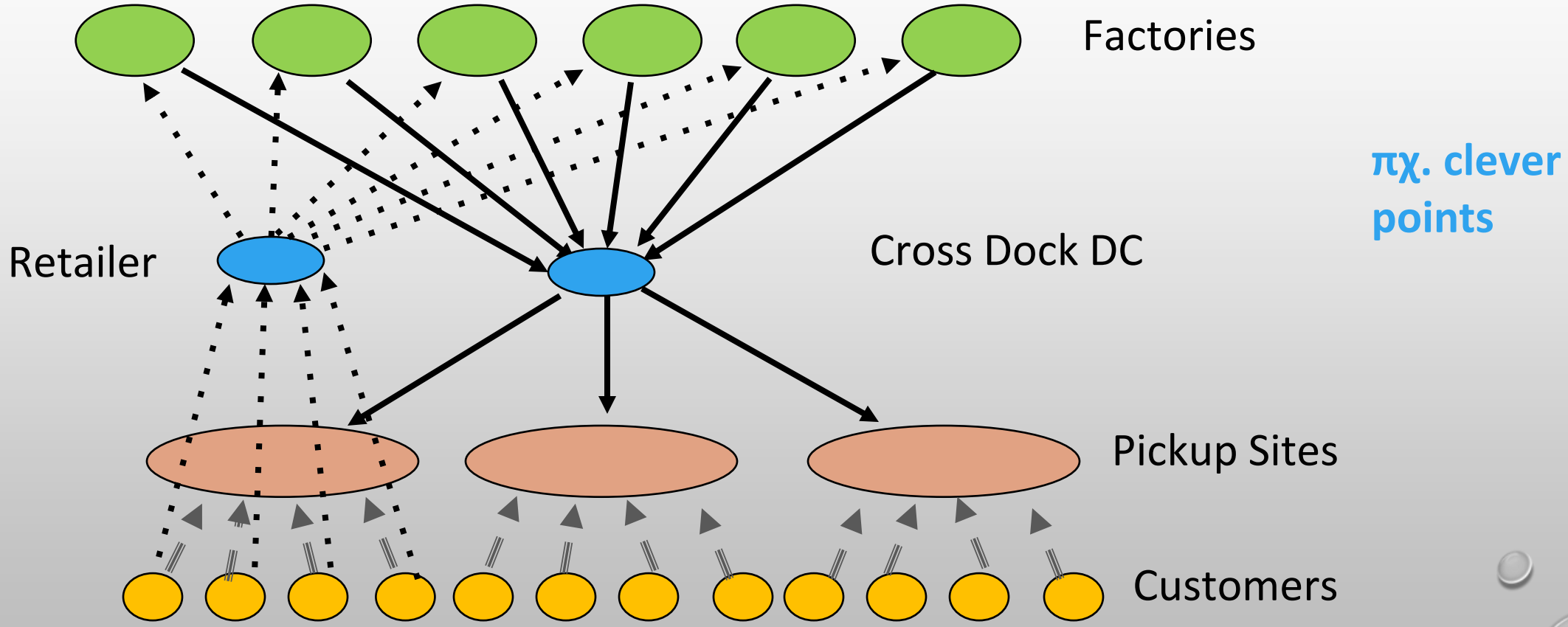
+++++

- Companies do not worry about warehouse operations, fleet management, or employee benefits — thereby offsetting some of the high costs and complex logistics associated with on-demand delivery.
- Better customer experience
  - greater control over the shopping experience
  - speed (one-hour delivery)
  - visibility into the delivery process.
  - desired time slot for delivery
  - track their packages along the way (receive SMS text alerts, push notifications, or even GPS tracking on their smartphones).

Crowdsourced last mile delivery/ Crowdsourcing Logistics

- Workforce issues
- Companies lose complete control of the management of delivery schedules and workloads.
    - brand damage
        - any of the outsourced shippers fail to deliver on time
        - poor face-to-face interaction between the outsourced shipper and customer
- Cost (delivery and ecommerce infrastructure) - the fees can be as high as 35% of the total order value.
- suburban and rural markets – are bike, foot and motorcycle fleets available?

Manufacturer/ Distributor Storage with Customer Pickup



πχ. clever points

Manufacturer/ Distributor Storage with Customer Pickup

Cost Factor	Performance
Inventory	Can match any other option, depending on the loca-tion of inventory
Transportation	+ Lower than the use of package carriers, especially if using an existing delivery network.
Facilities and handling	– Facility costs can be high if new facilities have to be built. + Costs are lower if existing facilities are used. – The increase in handling cost at the pickup site can be significant.
Information	– Significant investment in infrastructure required.
Service Factor	**Performance**
Response time	+ Similar to package carrier delivery with manufacturer or distributor storage. Same-day delivery possible for items stored locally at pickup site.
Product variety	Similar to other manufacturer or distributor storage options.
Product availability	Similar to other manufacturer or distributor storage options.
Customer experience	– Lower than other options because of the lack of home delivery. Experience is sensitive to capability of pickup location.
Time to market	+ Similar to manufacturer storage options.
Order visibility	– Difficult, but essential.
Returnability	+ Somewhat easier given that pickup location can handle returns.

Customer Pickup Example: Amazon Locker

- Self-service delivery location to pick up and return your Amazon.com packages.
- Launched in 2011 in USA and UK.
- Pick up your package at a time that's convenient for you.
- Free of charge
- Once the package is delivered to the Amazon Locker, you receive an e-mail notification with a unique pickup code that includes the address and opening times for your selected Locker location.
- Items with shipping weight < 20 lbs.
- Packages must be picked up within 3 days.

Amazon Locker

Amazon Locker

Source: http://www.eagles-meadow.co.uk/amazon-locker.html

Skroutz.gr Points

Απρίλιος 2021, η **Skroutz Last Mile**

- και με ηλεκτρικά βαν με 0% εκπομπή ρύπων
- δίνει τη δυνατότητα στον καταναλωτή να ανταμείψει τον διανομέα με tip, μέσω ενός link που λαμβάνει σε SMS με το πέρας της παράδοσης.

"**Skroutz Point" -** σημεία αυτόματης παραλαβής του Skroutz,

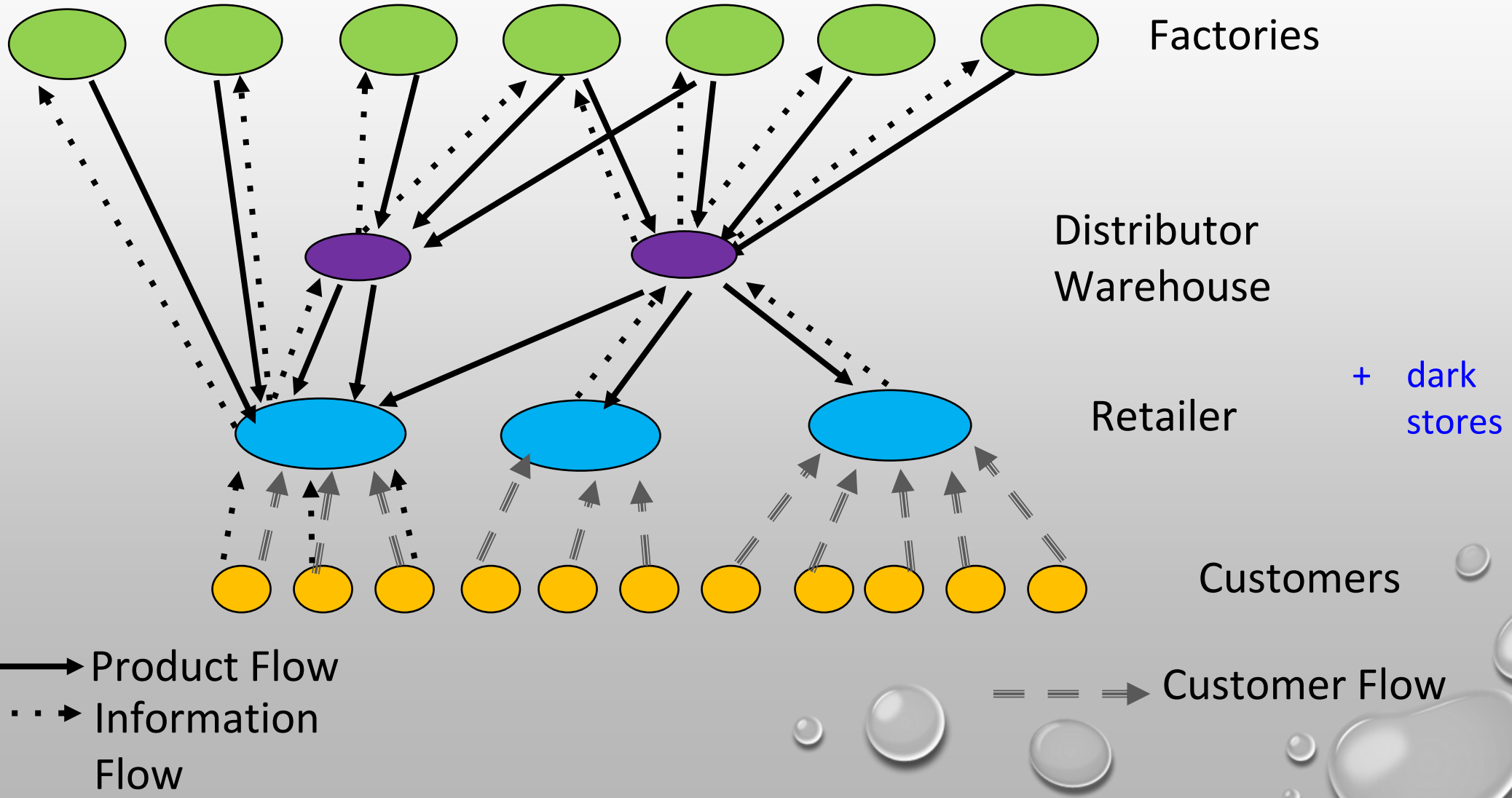
- εντός 3 ημερών από τη στιγμή που το δέμα θα φτάσει στο locker, με ευέλικτές ώρες παραλαβής
- ο καταναλωτής βάζει τα προϊόντα της επιλογής του στο καλάθι,
- επιλέγει παράδοση σε ένα από τα **24 Skroutz Point**,
- λαμβάνει ενημέρωση και τον προσωπικό κωδικό PIN μέσω SMS και παραλαμβάνει την παραγγελία του, εντός 3 ημερών.
- **24 -> 250 σε Αθήνα Θεσσαλονίκη το 2022**

Cityzen – 5 points

- 1 - Μπες στο πάρκινγκ και ρώτησε τον υπάλληλο πού να παρκάρεις το αμάξι σου για την παραλαβή από Skroutz.
- 2 - Αφού σου υποδείξει ο υπάλληλος του πάρκινγκ πού να σταθμεύσεις, κατευθύνσου προς το Skroutz Point.
- 3 - Βρες το SMS που σου έχει στείλει η Skroutz με το pin της θυρίδας σου.
- 4 - Πληκτρολόγησε το pin στο πληκτρολόγιο και πάτησε Enter. Η θυρίδα σου θα ανοίξει αυτόματα.
- 5 - Παράλαβε το δέμα από τη θυρίδα και βεβαιώσου ότι έκλεισες καλά τη θυρίδα για τον επόμενο.

Η skroutz διπλασίασε τις πωλήσεις της από τα 19,85 εκατομμύρια ευρώ που ήταν το 2019 σε 38,8 εκατομμύρια ευρώ το 2020.

Retail Storage with Customer Pickup



Retail Storage with Customer Pickup

Cost Factor	Performance
Inventory	– Higher than all other options.
Transportation	+ Lower than all other options.
Facilities and handling	– Higher than other options. The increase in handling cost at the pickup site can be significant for online and phone orders.
Information	– Some investment in infrastructure required for online and phone orders.

Service Factor	Performance
Response time	+ Same-day (immediate) pickup possible for items stored locally at pickup site.
Product variety	– Lower than all other options.
Product availability	– More expensive to provide than all other options.
Customer experience	Related to whether shopping is viewed as a positive or negative experience by customer.
Time to market	– Highest among distribution options because the new product has to penetrate through the entire supply chain before it is available to customers.
Order visibility	+ Trivial for in-store orders. – Difficult, but essential, for online and phone orders.
Returnability	+ Easier than other options because retail store can provide a substitute.

Walmart Example

Pickup Discount

Save even more.

Enjoy extra savings with a discount on select items! Just order online and choose to pick it up at store.

Shop Pickup Discount ▸

Pickup Discount FAQ

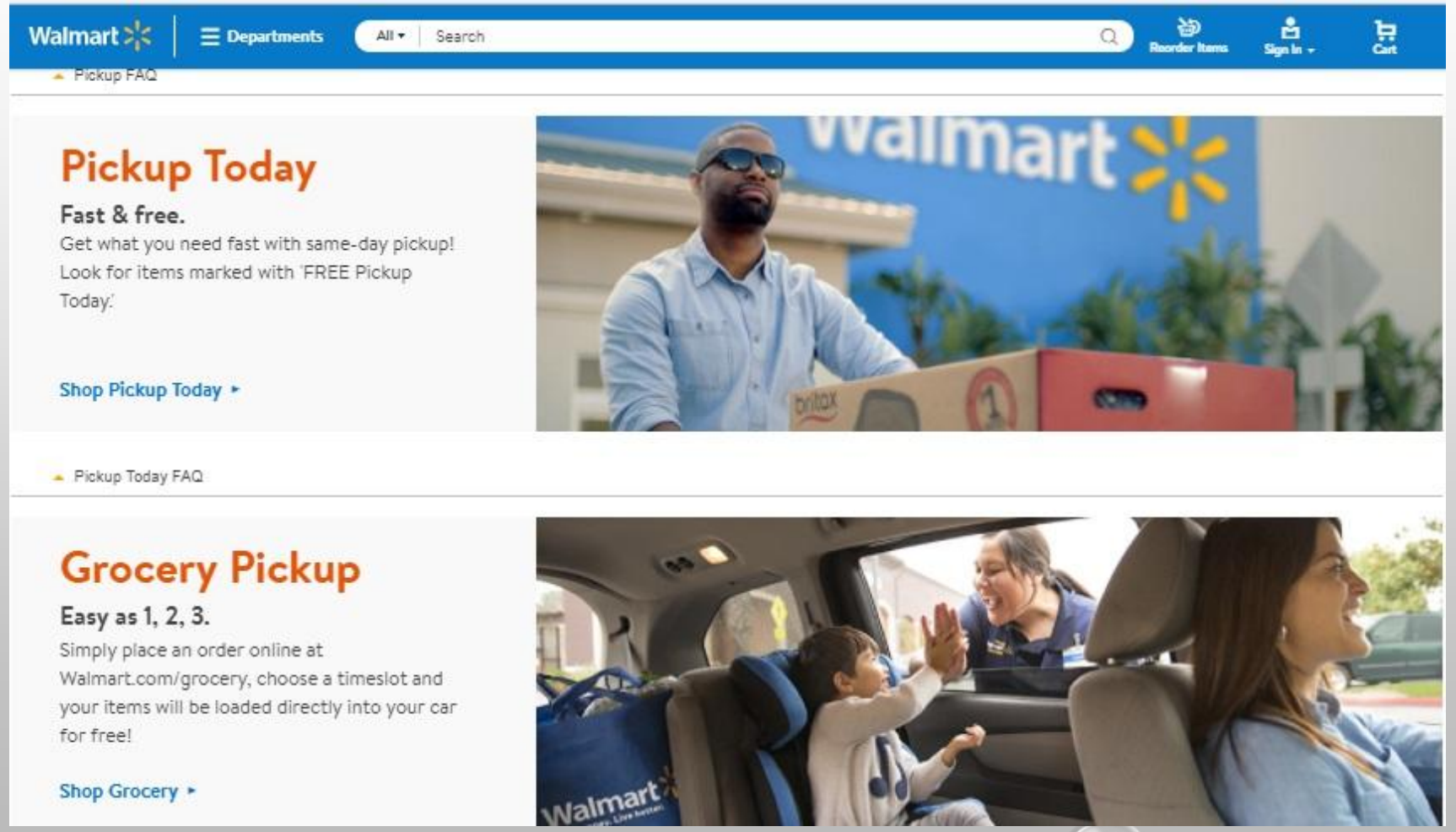
Pickup

Shop with ease.

Choose store pickup for your online order and we'll email you when it's ready.

Shop Pickup Items ▸

Walmart Example



Selecting Distribution Network Design

Most companies utilize a combination of distribution options.

The distribution network designer considers: product characteristics, customer needs and firm's strategy.

Fast moving products are best stocked locally and customers can either pickup them from retail stores directly or have them delivered.

Slow moving items can be stocked at a regional distribution center from where they are shipped to the customer within a day or two.

Very slow moving items best fit drop shipping.

The Use of Drones for Last-Mile Delivery: A Numerical Case Study in Milan, Italy

Εισαγωγή

- Η μελέτη εξετάζει αν τα drones μπορούν να υποστηρίξουν βιώσιμα και αποδοτικά τις παραδόσεις last-mile στο Μιλάνο.
- Το ενδιαφέρον εστιάζει σε τρεις διαστάσεις: περιβαλλοντική βιωσιμότητα, λειτουργική αποδοτικότητα και οικονομική βιωσιμότητα.
- Τα drones θεωρούνται ελκυστικά επειδή είναι ηλεκτροκίνητα, παρακάμπτουν μέρος της οδικής συμφόρησης και υπόσχονται ταχύτερη εξυπηρέτηση.

Εισαγωγή

Τα μη επανδρωμένα αεροσκάφη, καθώς είναι ηλεκτροκίνητα, προσφέρουν πλεονεκτήματα όπως:

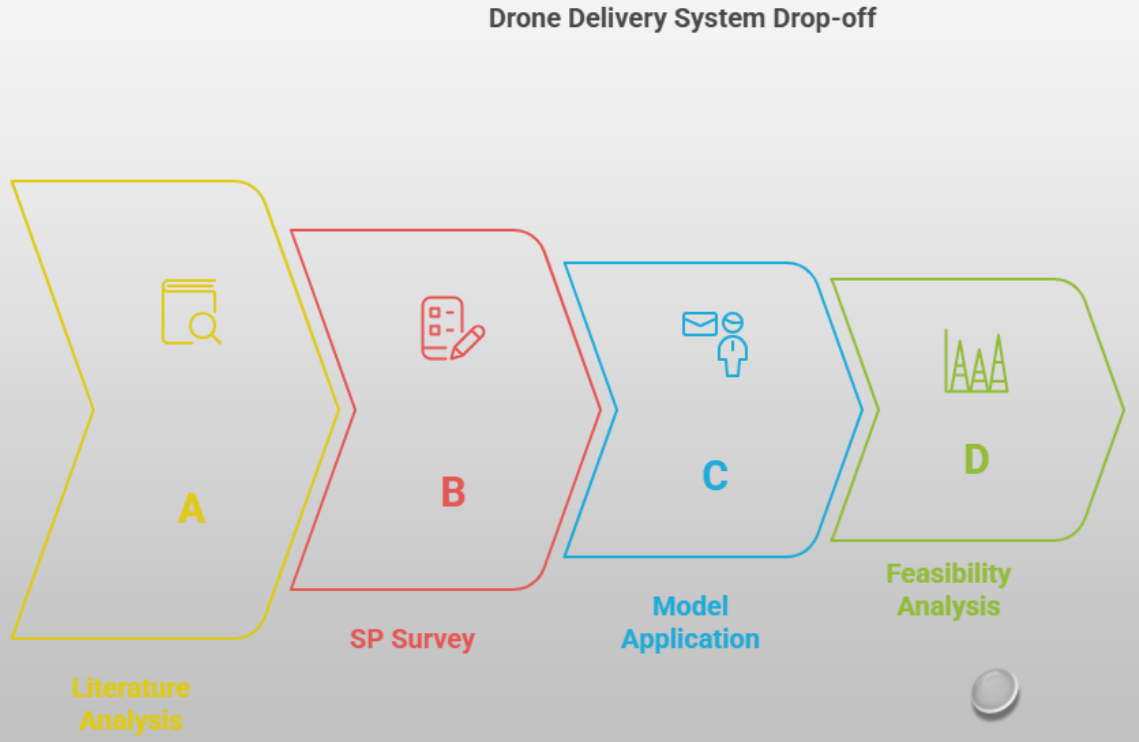
- μειωμένες περιβαλλοντικές επιπτώσεις,
- μειωμένη κυκλοφοριακή συμφόρηση στους δρόμους
- ταχύτερους χρόνους παράδοσης.

Η έρευνα περιλαμβάνει:

1. μια **έρευνα** αποδοχής των χρηστών,
2. μια **οικονομική ανάλυση** για τους φορείς εφοδιαστικής
3. **εκτιμήσεις** για τον επιχειρησιακό σχεδιασμό

Μεθοδολογία

- survey χρηστων - συγκρίνονται 4 μέσα παράδοσης: φορτηγό, ποδήλατο, σκούτερ και drone.
- Τα βασικά χαρακτηριστικά αξιολόγησης είναι: ναύλος παράδοσης, χρόνος παράδοσης και αξία αγαθού.
- Στη συνέχεια, τα αποτελέσματα μεταφέρονται σε σενάριο εφαρμογής για το Μιλάνο.



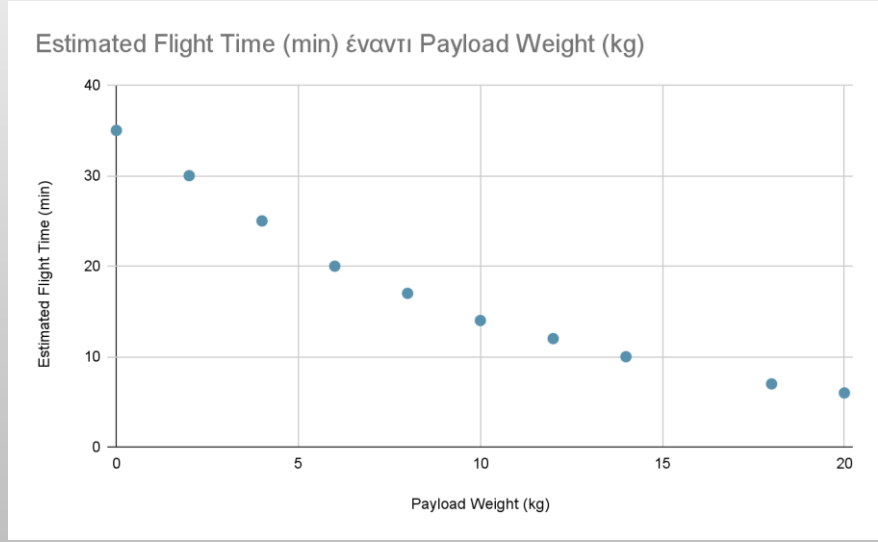
Πυρήνας του paper

Η μελέτη οργανώνει το πρόβλημα γύρω από τέσσερις βασικούς άξονες: routing, drone assignment, charging infrastructure και fleet sizing.

Συνεκτιμά ζητήματα ασφάλειας, αξιοπιστίας και περιβαλλοντικών επιπτώσεων.

Δίνει ιδιαίτερη βαρύτητα σε δύο ερωτήματα:

- αν οι χρήστες θα επέλεγαν παράδοση με drone αντί συμβατικών μέσων,
- αν ένα τέτοιο επιχειρηματικό μοντέλο είναι οικονομικά βιώσιμο για έναν πάροχο logistics.



User Survey

Η έρευνα εκτίμησε την αποδοχή των χρηστών απέναντι στην παράδοση με drone σε σχέση με πιο παραδοσιακές λύσεις.

100 απαντησεις

Για αγαθά υψηλής αξίας, ο χρόνος παράδοσης αναδείχθηκε ως ο σημαντικότερος παράγοντας επιλογής.

Για αγαθά χαμηλής αξίας, μεγαλύτερο βάρος δόθηκε στο κόστος της παράδοσης.

Άρα, η ζήτηση για drone δεν εξαρτάται μόνο από την ταχύτητα, αλλά και από το είδος του προϊόντος.

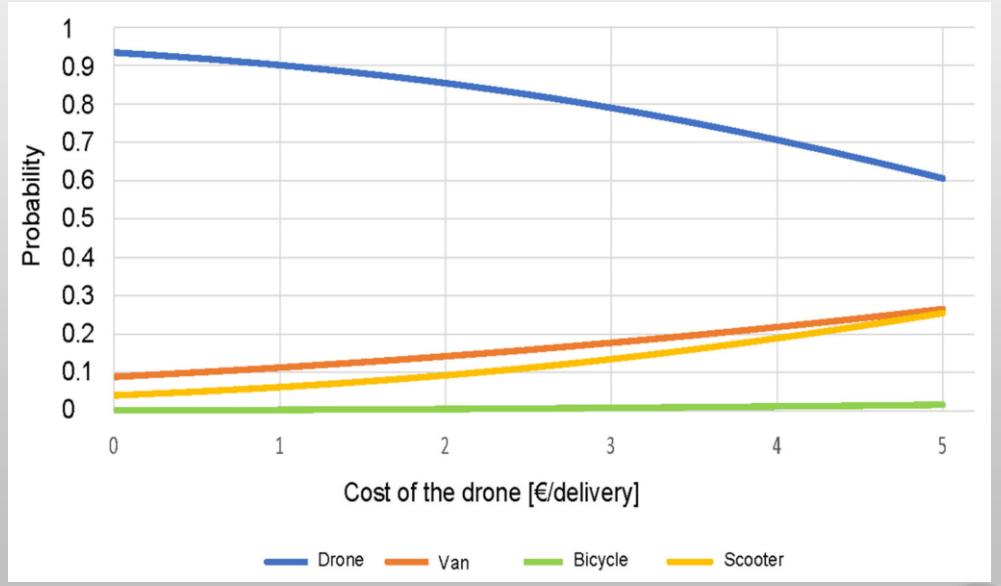
User Survey

Το drone εμφανίζεται ως η πιο ελκυστική επιλογή όταν προσφέρει πολύ γρήγορη παράδοση.

Η ανταγωνιστικότητά του μειώνεται αισθητά όταν ο ναύλος υπερβαίνει τα 3,75 € ανά αποστολή.

Αντίστοιχα, το πλεονέκτημά του αποδυναμώνεται όταν ο χρόνος παράδοσης ξεπερνά τα 28,5 λεπτά (προτιμουν scooter0

Το βασικό συμπέρασμα είναι ότι η αποδοχή εξαρτάται από ένα στενό συνδυασμό ταχύτητας και τιμής.



Operational sizing – αποτελέσματα για το Μιλάνο

Η μελέτη μεταφράζει τη δυνητική ζήτηση σε απαιτήσεις στόλου και υποδομών για αστική εφαρμογή.

Στο σενάριο του Μιλάνου εξετάζονται ημερήσιος όγκος παραδόσεων, χρονοευαίσθητα δέματα, αναγκαίος αριθμός drones και αριθμός depots.

Τα αποτελέσματα δείχνουν ότι η υπηρεσία απαιτεί οργανωμένη υποδομή και όχι μεμονωμένη χρήση drones.

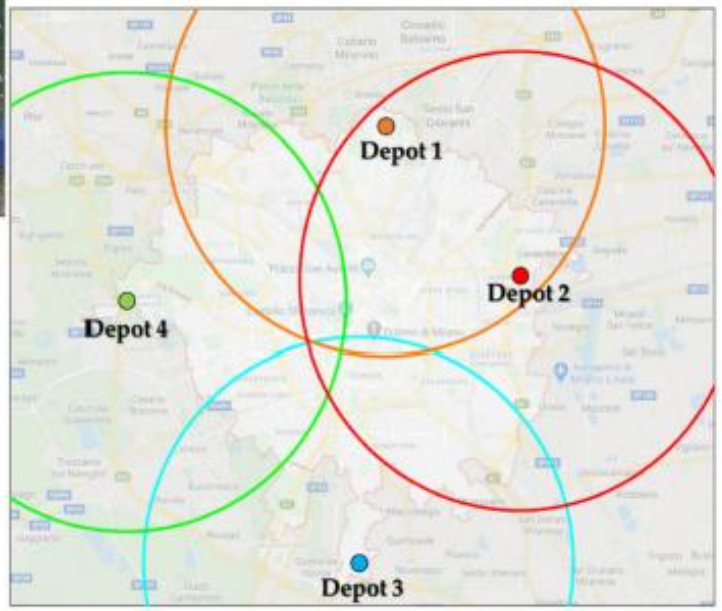
Η επιχειρησιακή σκοπιμότητα προκύπτει μόνο όταν ο σχεδιασμός στόλου είναι συμβατός με τη ζήτηση.

350K - number of daily deliveries in the city of Milan at about 350,000

- 5% of these deliveries can be delivered by drones.

240 drones / depot

18 daily deliveries / drone



Οικονομική ανάλυση – βασικά ευρήματα

Η οικονομική αξιολόγηση περιλαμβάνει κόστος drone, συντήρηση, κατανάλωση ενέργειας και έξοδα αποθήκης.

Στο εξεταζόμενο σενάριο, η υπηρεσία καθίσταται κερδοφόρα μετά από περίπου τρία έτη λειτουργίας.

Το break-even επιτυγχάνεται στο τρίτο έτος, στοιχείο ιδιαίτερα σημαντικό για πιθανό επενδυτή ή πάροχο logistics.

Η τιμή 3,75 € ανά παράδοση προκύπτει ως βέλτιστη ισορροπία μεταξύ αποδοχής χρηστών και οικονομικής βιωσιμότητας.

Συγκεντρωτικά αριθμητικά αποτελέσματα

3,75 € — κρίσιμο/βέλτιστο επίπεδο χρέωσης ανά παράδοση

28,5 λεπτά — όριο χρόνου πέρα από το οποίο μειώνεται η ελκυστικότητα του drone

3 έτη — χρονικός ορίζοντας επίτευξης break-even και μετάβασης σε κερδοφορία

18 παραδόσεις ανά drone — ενδεικτική ημερήσια παραγωγικότητα στο σενάριο του Μιλάνου

Συζήτηση των αποτελεσμάτων

Τα drones δεν υπερέχουν πάντα· υπερέχουν όταν ο πελάτης αποτιμά έντονα την ταχύτητα και όταν η τιμή παραμένει ελεγχόμενη.

Η τεχνολογία είναι καταλληλότερη για επείγουσες ή υψηλής αξίας αποστολές παρά για κάθε είδος last-mile παράδοσης.

Η οικονομική βιωσιμότητα εξαρτάται από την κλίμακα λειτουργίας και από την ύπαρξη κατάλληλου δικτύου depots και στόλου.

Επομένως -> στοχευμένη και όχι γενικευμένη υιοθέτηση των drones.

Συμπεράσματα

Η μελέτη καταλήγει ότι τα drones αποτελούν ρεαλιστική επιλογή για βιώσιμες παραδόσεις last-mile σε αστικό περιβάλλον, υπό συγκεκριμένες προϋποθέσεις.

Το ισχυρότερο εύρημα είναι ότι η επιτυχία τους καθορίζεται από την ισορροπία ανάμεσα σε χρόνο, κόστος και τύπο αποστολής.

Για το Μιλάνο, το σενάριο εφαρμογής δείχνει ότι υπάρχει επιχειρησιακή και οικονομική σκοπιμότητα σε μεσοπρόθεσμο ορίζοντα.

Άρα, τα drones μπορούν να λειτουργήσουν ως συμπληρωματική λύση logistics με σαφή οφέλη για επιλεγμένες κατηγορίες παραδόσεων.

Καλή συνέχεια

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