ΧΑΡΟΚΟΠΕΙΟ ΠΑΝΕΠΙΣΤΗΜΙΟ
HAROKOPIO UNIVERSITY

Supply Chain Management

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Σκοπός

Σκοπός του μαθήματος είναι οι φοιτητές να αποκτήσουν γνώση και εμπειρία σε θέματα διαχείρισης της εφοδιαστικής αλυσίδας. Δίνεται έμφαση στη χρήση των τεχνολογιών πληροφορικής και επικοινωνιών (ΤΠΕ) για τη βελτίωση και τον ψηφιακό μετασχηματισμό των διαδικασιών και την υποστήριξη λήψης αποφάσεων στην εφοδιαστική αλυσίδα.

Μαθησιακά αποτελέσματα

- Κατανόηση των βασικών διαδικασιών της εφοδιαστικής αλυσίδας
- Κατανόηση των στόχων διαχείρισης της αλυσίδας αξίας και των παραγόντων κόστους
- Κατανόηση των επιπτώσεων της πανδημίας στην εφοδιαστική αλυσίδα
- Κατανόηση της σημασίας της ποιοτικής εξυπηρέτησης και της δημιουργίας αξίας για τον πελάτη
- Κατανόηση των διαδικασιών διαχείρισης αποθηκών, των συστημάτων διαχείρισης αποθήκευσης και του οφέλους από λύσεις αυτοματοποίησης/ ρομποτικής
- Κατανόηση και αποτίμηση οφέλους της εφαρμογής ΤΠΕ στην εφοδιαστική αλυσίδα
- Κατανόηση, Αξιολόγηση και εφαρμογή μεθόδων πρόβλεψης ζήτησης στην εφοδιαστική αλυσίδα
- Κατανόηση του ρόλου του αποθέματος στην εφοδιαστική αλυσίδα και των μοντέλων αποθέματος
- Επιλογή στρατηγικών διαχείρισης αποθέματος στην εφοδιαστική αλυσίδα
- Κατανόηση των στρατηγικών διανομής της εφοδιαστικής αλυσίδας με τα υπέρ και τα κατά τους.
- Διατύπωση πρότασης υιοθέτησης IoT (Internet of Things) λύσεων στην εφοδιαστική αλυσίδα εκτιμώντας το υπό εξέταση πρόβλημα
- Διατύπωση πρότασης υιοθέτησης λύσεων επιχειρηματικής αναλυτικής στην εφοδιαστική αλυσίδα εκτιμώντας το υπό εξέταση πρόβλημα
- Κατανόηση των πρακτικών βιωσιμότητας και της σημασίας τους για την εφοδιαστική αλυσίδα

Περιεχόμενα

- Εισαγωγή στις βασικές έννοιες της διαχείρισης της εφοδιαστικής αλυσίδας
- Βασικές λειτουργίες/ διαδικασίες της εφοδιαστικής αλυσίδας, Στρατηγικός σχεδιασμός,
- Εξυπηρέτηση πελατών - Διαδικασίες εξυπηρέτησης, παράγοντες ποιοτικής εξυπηρέτησης, δημιουργία αξίας για τον πελάτη, δείκτες αξιολόγησης
- Διαχείριση αποθηκών - Χωροταξικοί παράγοντες, συστήματα αποθήκευσης (οργάνωση θέσεων αποθήκευσης)
- Διαχείριση αποθηκών – Διαδικασίες, συστήματα διαχείρισης αποθηκών, εφαρμογές ρομποτικής και αυτοματοποίησης
- Πληροφοριακά συστήματα στην εφοδιαστική αλυσίδα
- Στρατηγικές διανομής προϊόντων - Υπέρ και κατά, διανομή μέσα στην πόλη, μελέτες περίπτωσης
- Πρόβλεψη ζήτησης στην εφοδιαστική αλυσίδα – Εναλλακτικά μοντέλα πρόβλεψης, μετρικές αξιολόγησης, χρήση εφαρμογής λογιστικών φύλλων για πρόβλεψη ζήτησης
- Διαχείριση αποθέματος - Τύποι αποθέματος, κόστη αποθεματοποίησης, μοντέλα και πρακτικές αποθέματος, χρήση εφαρμογής λογιστικών φύλλων για διατύπωση παραγγελίας σύμφωνα με την πρόβλεψη ζήτησης και το επιλεγμένο μοντέλο αποθεμάτος
- Χρήση τεχνολογιών IoT (Internet of Things) στην αλυσίδα αξίας - Οφέλη, υποστήριξη λήψης αποφάσεων, μελέτες περίπτωσης (Industry 4.0)
- Χρήση επιχειρηματικής αναλυτικής (Business Analytics) στην αλυσίδα αξίας –Οφέλη, υποστήριξη λήψης αποφάσεων, μελέτες περίπτωσης
- Βιώσιμη αλυσίδα αξίας - Πρακτικές, μελέτες περίπτωσης

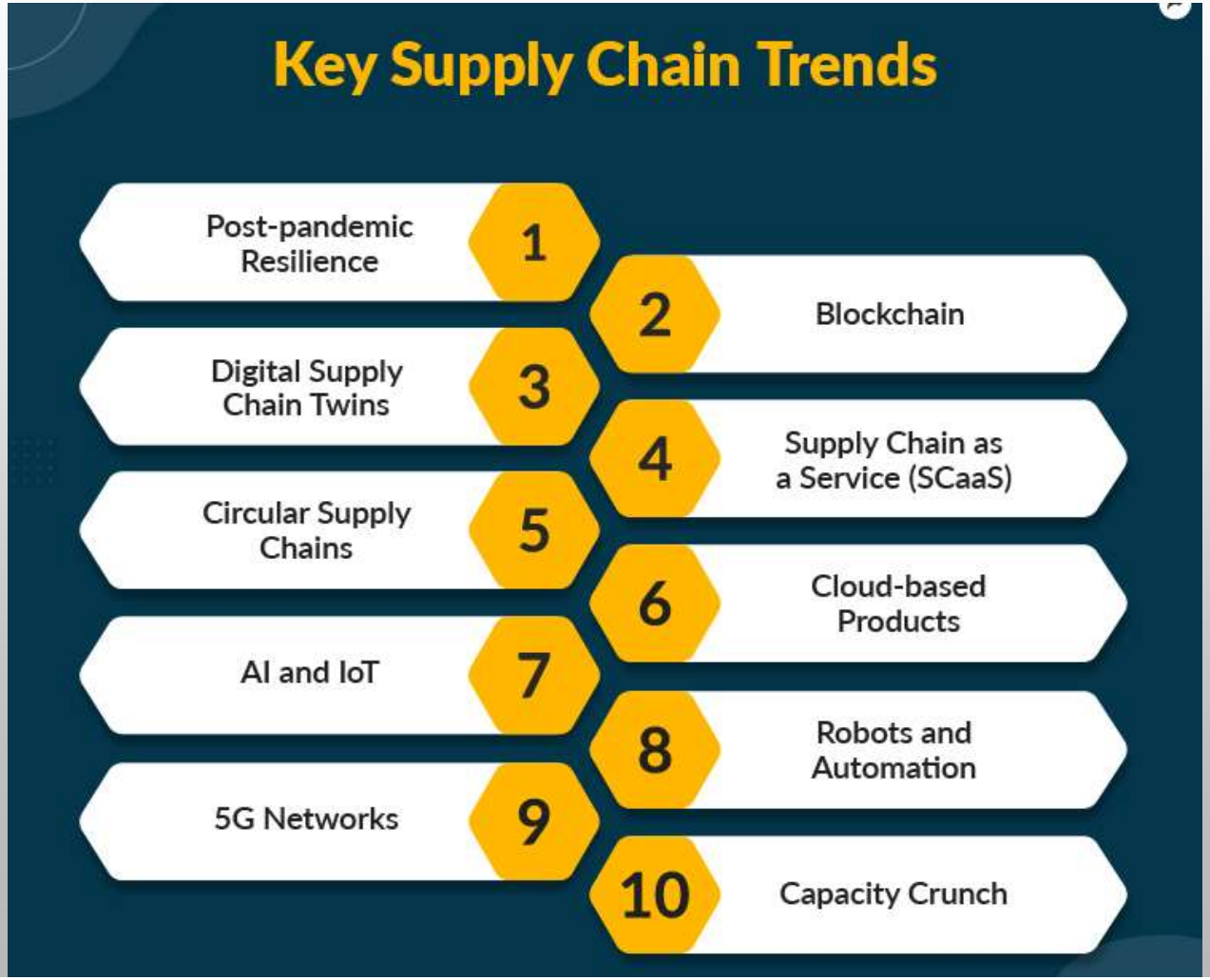
Αξιολόγηση

- Εξετάσεις (65%)
- Μελέτη + Κατανόηση άρθρου (paper) (35%)
  - 1-2 άτομα ανά άρθρο

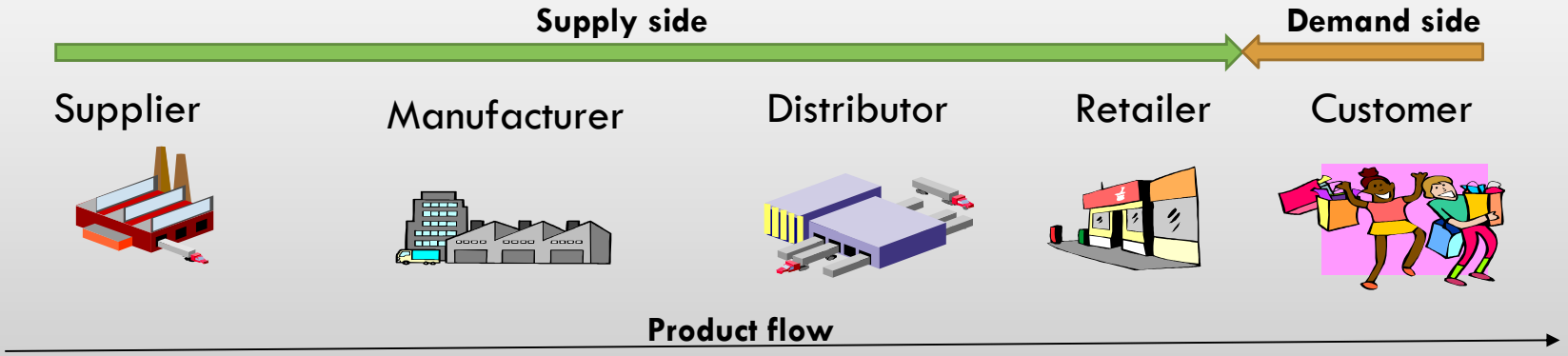
άρθρα

- Digital twin for sustainable manufacturing supply chains: Current trends, future perspectives, and an implementation framework
- Stock visibility for retail using an RFID robot
- …..

Όραμα/ Στόχος πίσω από τη μελέτη των άρθρων

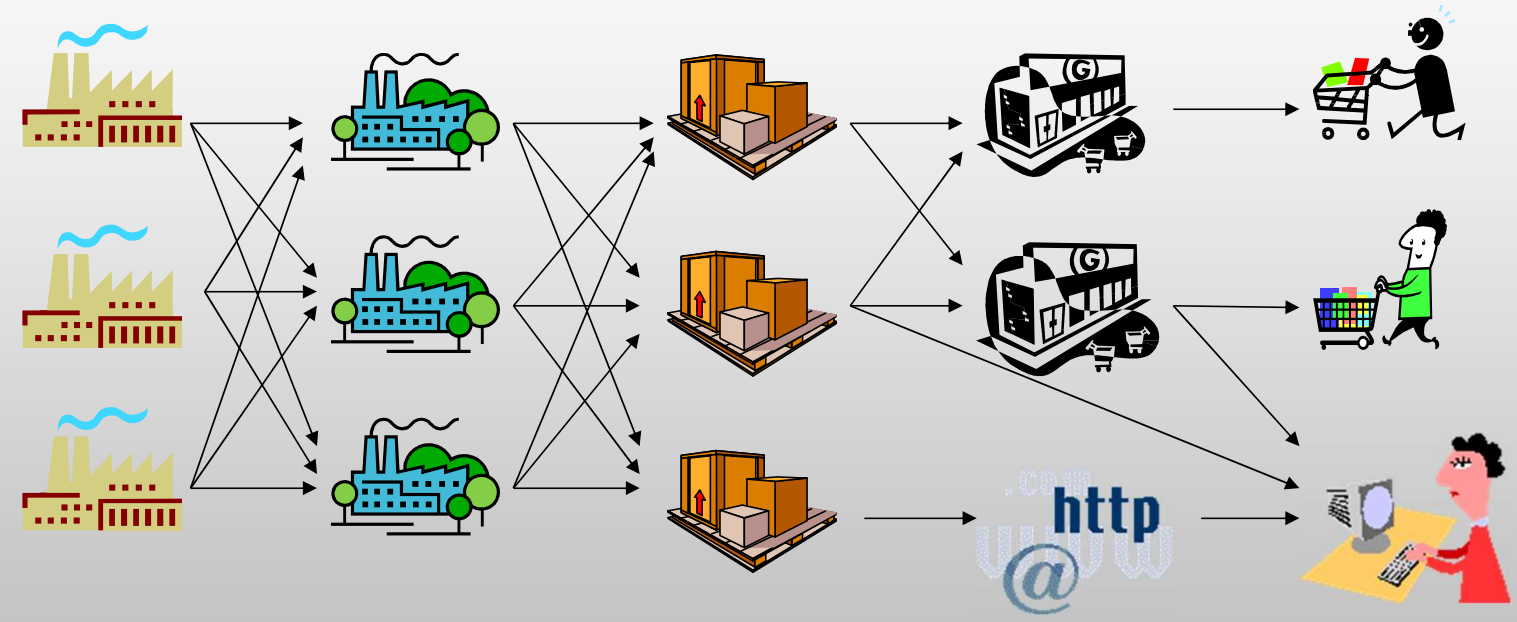


A Typical Supply Chain



In a basic supply chain, raw materials are procured from suppliers and product items are produced at the manufacturers' factories, shipped to warehouses and distributions centers, and then shipped to retailers to reach the customers.

Supply Network



Supplier → Manufacturer → Distributor/ Wholesaler → Retailer → Customer

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.

Supply Chain's Objective

SC Main Objective: Maximization of the overall Value generated

SC Value: the difference between what the final product is worth to the customer and the costs the supply chain incurs in filling the customer's request.

In other words, **SC Value = SC Profitability/ Surplus,** namely the difference between the revenue generated from the customer and the overall cost across the supply chain.

SC value ought to be shared across all supply chain stages and intermediaries and it should be measured across the entire value chain and not in terms of the profits at an individual stage. The focus on profitability at individual stages may lead to a reduction in the overall supply chain profits.

Supply Chain Management

Successful, Profitable SC Management achieves:

right **Product/ Service,**

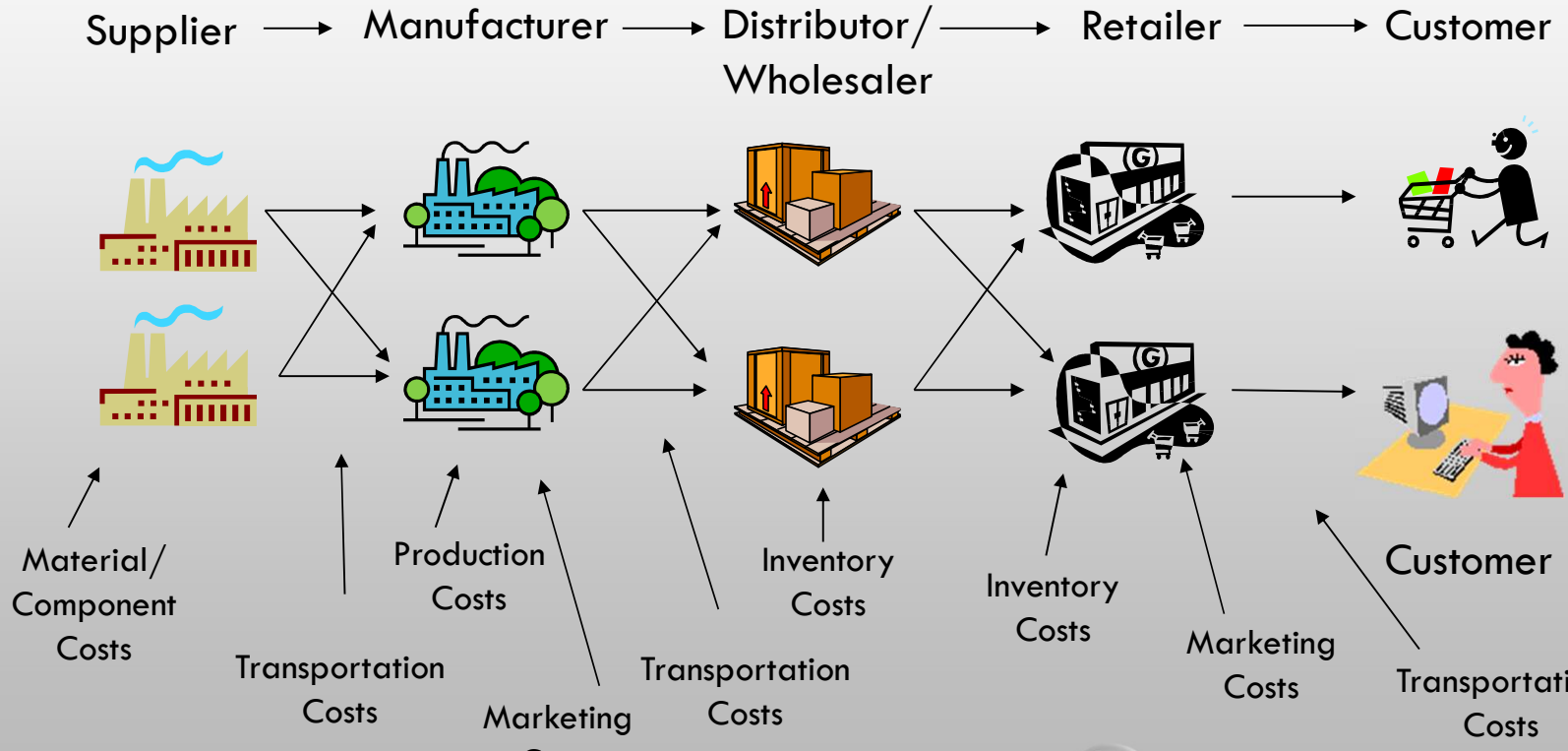
for the right **Customer,**

at the right **Quantity,**

the right **Location,** and

at the right **Price.**

Supply Chain Management



SC Costs vs. Customer Service level

SCM is difficult

BMW recently suffered production stoppage of its 3-Series sedan in Germany, China, and South Africa, due to Bosch's failure to supply the necessary steering gears. Aside from its 3-Series sedan, production of BMW's 1-, 2-, and 4-Series were also affected. While the financial impact of the stoppage has yet to be measured, BMW is seeking compensation from Bosch for the disruption. (source https://www.liaison.com/blog/2017/09/18/key-issues-supply-chain-management-overcome/)

Japan Earthquake and Tsunami of 2011 costed Japan about $210 billion. It shook SC all over the world. Electronics and auto manufacturing facilities were flooded, and in some cases, destroyed. Toyota, Nissan, and G.M. were forced to temporarily shut down some of their facilities in the U.S. and Japan because they could not ship or receive required components.

Supply Chain Decisions

SCM that intends to raise the supply chain surplus requires many SC decisions.

Each SC decision is effective when it contributes to the raising of the SC profitability.

3 types of SC decisions with

- different frequency
- different time phase during which a decision has an impact.

Supply Chain Decisions

3 types of SC decisions that concern

- **SC Strategy/ Design**
- **SC Planning**
- **SC Operation**

SC Strategy/Design Decisions

SC design (strategic-level) decisions have a long lasting effect on the firms.

These decisions consider the structure of the SC over the next several years, namely

- resources allocation
- the processes each SC stage will perform
- the number, the location and the capacities of production and warehousing facilities
- the products to be manufactured or stored at various locations
- the transportation modes
- the Information Systems utilized
- outsourcing SC functions
- offshoring.

SC Strategy/Design Decisions

More SC strategic decisions

- new product design
- strategic partnerships
- supply contracts

SC design decisions are very expensive to alter on short notice.

When companies make such decisions, they must take into account uncertainty in anticipated market conditions over the next few years.

SC Planning Decisions

SC planning decisions (tactical-level decisions) are typically updated between once every quarter and once every year.

The strategic SC configuration has already been determined and it establishes constraints that planning must respect.

SC planning is used to take into account a demand forecast for the coming year (or a comparable time frame) in the different markets.

SC Planning Decisions

SC planning decisions include

- which markets will be supplied from which locations
- subcontracting of manufacturing
- inventory policies to be followed
- the frequency, the timing and the size of marketing and price promotions

Such decisions must consider demand uncertainty, exchange rates, and competition over the decisions' time horizon.

SC planning decisions define a set of operating policies that govern short-term operations.

SC Operation Decisions

SC operation decisions (operational-level decisions) refer to day-to-day or weekly decisions and they concern individual customer orders.

With an already fixed SC configuration and defined planning policies, SC operations aim to handle incoming customer orders in the best possible manner.

Such decisions face less demand uncertainty, because they are being made in the short term (minutes, hours, or days). Thus, SC operation phase aims to exploit the reduction of uncertainty and optimize performance.

SC Operation Decisions

SC operation decisions include

- inventory or production allocation to individual orders
- setting order fulfillment dates
- generating pick lists at warehouses
- generating shelves replenishment lists in stores
- order allocation to a particular shipping mode and shipment
- setting orders' delivery schedules of trucks
- trucks loading
- placing stores' replenishment orders

Supply Chain Performance Drivers

SC drivers interact with each other to determine a SC's performance in terms of responsiveness and efficiency.

The structure, the performance of SC drivers determines if and how strategic fit is achieved across the SC.

Good SC management makes the appropriate trade-offs between these drivers to accomplish the desired level of responsiveness.

Supply Chain Performance Drivers

Supply Chain Performance Drivers

1. *Facilities/ Υποδομές:* physical locations in the SC where product is stored, assembled, or fabricated.
2. *Inventory/ Απόθεμα*: all raw materials, work in process, and finished goods within a SC.
3. *Transportation*: moving inventory from point to point in the SC via many combinations of modes and routes.

Supply Chain Performance Drivers

4. *Information*: data and data analysis concerning facilities, inventory, transportation, costs, prices, and customers throughout the SC (consider Big Data, data analytics)

5. *Sourcing:* who performs each SC activity such as production, storage, transportation, or the management of information -> in-house or outsource activities

6. *Pricing*: how much a firm charges for its goods and services (consider differential pricing, dynamic pricing)

Information

the most critical SC driver

enables coordination and collaboration between SC partners

huge effect on SC decisions (consider data inaccuracies e.g. faulty demand forecasts)

Information -> Information technology

Information-related Metrics

Information Quality

Forecast horizon

Frequency of forecast update

Forecast error

Seasonal factors

Variance from plan

Ratio of demand variability to order variability

INVENTORY: WHAT

- Raw material
  - ☑ not processed yet
- Work-in-process
  - ☑ Under processing, not completed
- Maintenance/repair/operating (MRO)
  - ☑ Necessary for maintenance and repair of equipment
- Finished goods
  - ☑ Completed product awaiting for shipment

INVENTORY: WHAT

- We need inventory to handle mismatch between supply and demand.
- major source of cost, great influence on responsiveness
- Significant impact on *material flow time*: time elapsed between the point at which material enters the SC to the point at which it exits.
  - ✓ Throughput: rate at which sales occur
  - ✓ Inventory (I) = Throughput (D) * Flow time (T)
  - ✓ Managers aspire reduced flow time -> reduced inventory

EXAMPLE

Χρόνος συναρμολόγησης μηχανής (flow time): 5 ώρες

Throughput: 30 μηχανές/ώρα

Απόθεμα = 30 * 5 = 150 μηχανές

Αν θέλω να μειώσω το απόθεμα μου στο μισό, χρειάζεται να βελτιώσω σημαντικά το χρόνο συναρμολόγησης (flow time). Δεν πειράζω τη ζήτηση.

Πως να βελτιώσω το χρόνο συναρμολόγησης;

INVENTORY: WHERE

- Suppliers and Manufacturers
- Warehouses and Distribution centers
- Retailers (sales floor, backroom)

INVENTORY: WHY?

- Overcome d*emand and supply uncertainty*
- Prevent *stock-out* incidents.
- Take advantage of quantity discounts -> *Economies of scale.*
- *Hedge against inflation and price changes.*
- Satisfy demand during *lead time* between supply chain stages
- Overcome production capacity limitations (e.g. stock products during spring to satisfy high demand in the summer)

INVENTORY-RELATED DECISIONS

Cycle inventory: average amount of inventory used to satisfy demand between receipts of supplier shipments.

- ✓ High cycle inventory -> high inventory holding cost vs. low cycle inventory with more frequent orders (ordering + shipping costs)

Safety inventory: inventory held in case demand exceeds expectations

- ✓ Inventory holding cost or lost-sales cost

Seasonal inventory: inventory built up to counter predictable demand variability

- ✓ Inventory carrying cost vs. flexible production cost

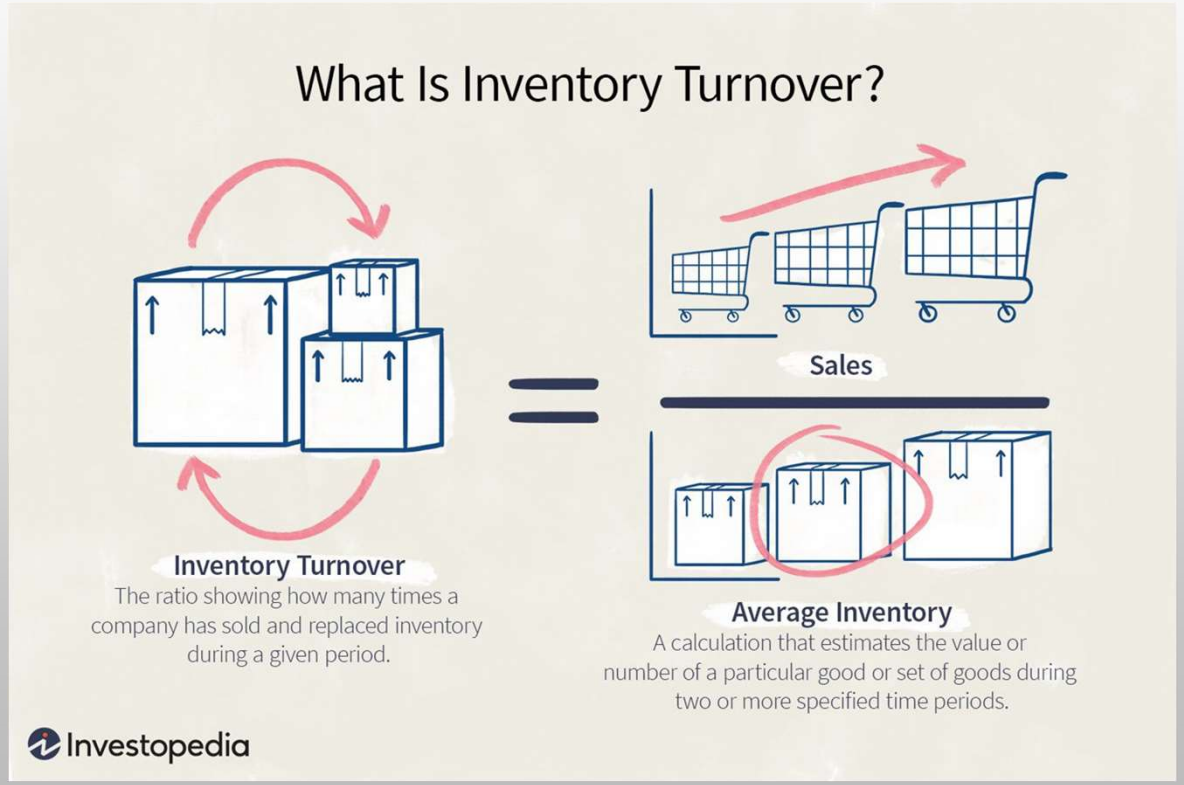
Product availability level: fraction of demand satisfied on time from available inventory

A MANAGER MONITORS INVENTORY-RELATED METRICS:

$$\text{Average Inventory Formula} = \frac{(\text{Beginning Inventory} + \text{Ending Inventory})}{2}$$

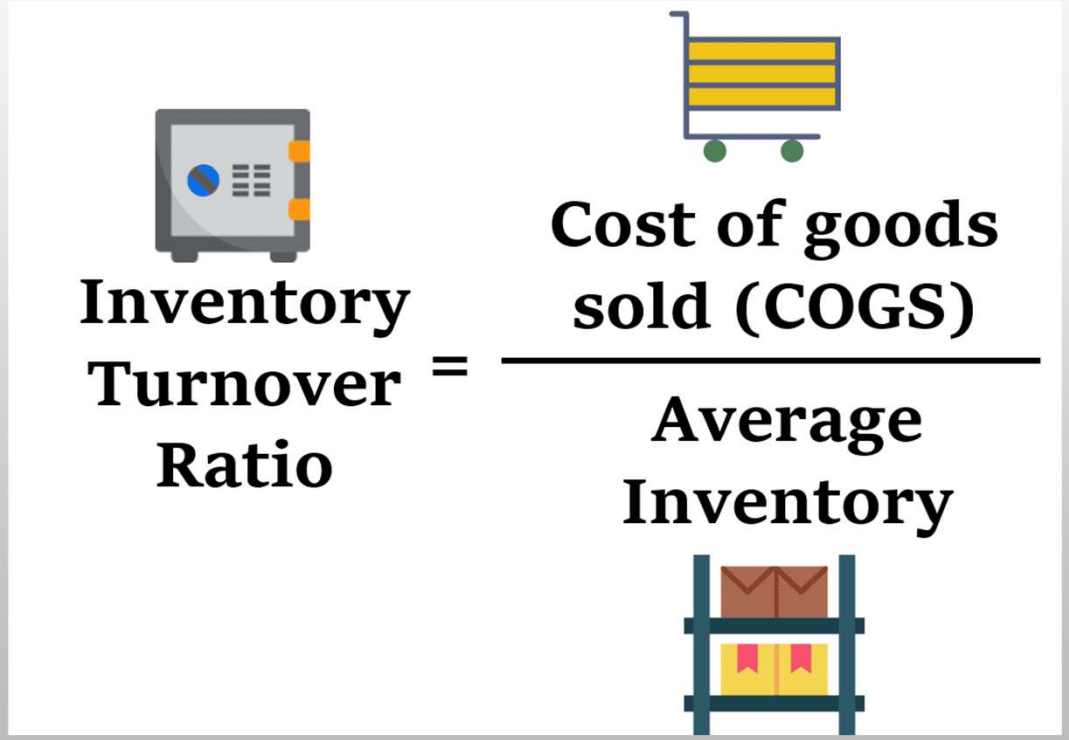
Έτσι λαμβάνω υπόψη και ενδεχόμενες πτώσεις ή κορυφώσεις που έγιναν μέσα στην περίοδο που εξετάζω

A MANAGER MONITORS INVENTORY-RELATED METRICS:



Inventory turnover: πόσες φορές η εταιρεία έχει διαθέσει το αποθεμα της μέσα σε μια χρονική περίοδο

A MANAGER MONITORS INVENTORY-RELATED METRICS:



Inventory turnover period: 365 / Inventory Turnover

INVENTORY MANAGEMENT GOAL

Strike a balance between

Customer Service level

Inventory Costs (Inventory Investment)

INVENTORY POLICY

How much to order

When to order

Optimal Order Quantity

INVENTORY POLICY

How much to order

When to order

Optimal Order Quantity

Καλή συνέχεια!!