Chapter 3 – 4
Logistics - Postal and courier services

COUrier Routing through Innovative Emulation Learning program
CONTENTS

• Logistics core concepts
• Logistics - postal services
• Postal services characteristics
• Postal services organization
• Distribution organization
  - Postal services
  - Courier services
• Distribution support technologies
• Problems and Prospects
Logistics core concepts
Logistics: Definition

Logistics is..."the process of planning, implementing, and controlling the efficient, effective flow and storage of goods, services, and related information from point of origin to point of consumption for the purpose of conforming to customer requirements"

Council of Logistics Management
Logistics: Basic and support functions

- Inventory management
- Materials management
- Packaging - protection
- Transportation
- Production scheduling
- Inventory management
- Order management
- Warehousing
- IT support
- Purchasing

Basic functions
Support functions
Logistics: Basic functions

The distribution network is the "heart" of the Supply Chain
Distribution network

The term "distribution network" describes the means and methods by way of which a product or group of products is transported or distributed from the point of production or sale to the end recipient.

The end recipient may be a plant, a retail point of sale or even the house of a consumer.
Distribution network

The distribution network is a system of resources between producer/service provider and final customer

Services networks
- Post offices and Courier services
- Telecommunications
- Electricity
- Pipelines

MAIN REQUIREMENT
Continuous operation
Distribution networks - topology

- Star
- Bus
- Ring
- Token ring
- Tree
- Mesh
Distribution networks - complexity

Number of users (Metcalfe's law)

\[ \text{Connections} = n*(n - 1)/2 \]

<table>
<thead>
<tr>
<th>Points of interest (Nodes)</th>
<th>1</th>
<th>2</th>
<th>5</th>
<th>10</th>
<th>12</th>
<th>50</th>
<th>100</th>
<th>200</th>
<th>1000</th>
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<tbody>
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<td>0</td>
<td>1</td>
<td>10</td>
<td>45</td>
<td>66</td>
<td>1225</td>
<td>4950</td>
<td>19900</td>
<td>499500</td>
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</table>

**Additional parameters:** \[n*(n - 1)/2]*D*N

\[D=\text{Directions} \]

\[N=\text{Frequency} \]
Types of logistics service providers

- Standard transport companies (transportation, warehousing, exports, etc)
- Logistics network service providers (cargo express forwarders, couriers, tracking, digital delivery receipt, JIT)
- Logistics infrastructure providers (distribution centres, containers, inventory management, production postponement methods)
- Logistics special service providers (consultants, information management, IT infrastructure, financing)
Types of distribution channels

Production → Retail point of sale

Production → Retail point of sale warehouse → Retail point of sale

Production → Wholesalers → Retail point of sale

Production → Wholesalers Cash & Carry → Retail point of sale
Types of distribution channels

Production → Brokers (pricing) → Retail point of sale

Production → Mail / phone orders → Postal service → CLIENT

Production → Postal service /courier → CLIENT
Distribution channel selection/ configuration decision-making parameters

• Business environment

• Customer needs

• Distribution channels characteristics
Logistics - Postal services
Logistics - Postal services

- Postal products & services portfolio
- Services characteristics
- Equipment
- Technologies
- Distribution organization
Postal products & services portfolio

- Financial Services
- Transportation
- Courier Services
- Postal services
- Marketing Services
- Distribution & deliveries
Postal services

- Basic
  - Universal
    - Reserved areas
      - Universal service providers
    - Non-reserved areas
      - Universal service providers + Others
  - Non-universal
    - Universal service providers + Others
- Courier
  - Universal service providers + Others
Postal services characteristics
Basic postal services characteristics

• Time is crucial only for first priority mail
• There is no competition or price geographical differentiation (single price for the entire territory)
• Partial use of Key Performance Indicators (KPI) and IT tracking and search systems
Express/Courier services characteristics

• Time criticality
• High flexibility and orientation to client needs (mainly speed and special requirements) are required
• Price competition/ cost control
• Application of monitoring indicators (KPIs) and IT technologies for item tracking and searching
Postal services organization
Linehaul - distribution network (Hub-and-spoke)

- Mail pickup
- Sorting centres - hubs
- Multimodal transport (linehaul transportation)
- Distribution unit
- Delivery routes
Postal services cost

Postal services cost allocation per phase of production process

- Transport: 15-30%
- Sorting: 15-25%
- Distribution: 50-70%
Cost reduction scenarios through automatic sorting

A. Envelopes and parcels
Sorting between correspondence for distribution and correspondence for sorting (50% reduction)

B. Parcels
Sorting per postman/route (50% reduction)
Sorting per street/point (10% reduction)
Sorting - routing per point of contact (20%)
Hub-and-Spoke

Advantages

– Efficient sorting: small number of sorting centres
– Time accuracy
– Easy incorporation of new points in the network
– Reduction of long-distance transportation
– Provision of express services at minimum cost
Hub-and-Spoke

Requirements

- Limited sorting time
- Cut-off Times
- Labour-intensive environment
- Detailed planning and coordination
- High sensitivity (wrong sorting generates multiple problems)
- Hub continuous operation
- Capacity management during peak and non-peak hours
Distribution organization:

• Postal services
• Express/courier services
Distribution organization:

- Postal services
## Tools: 5-digit postal code

### Structure – Operation: GR – 153 43

<table>
<thead>
<tr>
<th>6K</th>
<th>Country code 150</th>
<th>Use by clients and post office</th>
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<tbody>
<tr>
<td>15</td>
<td>Destination Sorting Centre</td>
<td></td>
</tr>
<tr>
<td>153</td>
<td>Destination Distribution Unit</td>
<td></td>
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<tr>
<td>43</td>
<td>Distribution zone</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>67</th>
<th>Distribution employee</th>
<th>Use only by post office</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>890</td>
<td>Series of distribution point</td>
<td></td>
</tr>
</tbody>
</table>
# Calculation of distribution areas

<table>
<thead>
<tr>
<th>Service time</th>
<th>Preparation</th>
<th>minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Distribution</td>
<td>minutes</td>
</tr>
</tbody>
</table>

| Travel times          | Time from departure to arrival                                               | minutes |
|                       | Route within area                                                           | Km      |

| Service time          | Correspondence volume                                                       | units   |
|                       | Mode of distribution performance                                            | means   |
|                       | Residential data                                                            | points  |
|                       | Distribution specificities                                                  | number  |
Mapping of distribution area*

Forms used in mapping

• Map of the area under review
• Working time calculation sheet
• Auxiliary sheet

*Mapping refers to urban areas with a street-numbering system
Map of the area under review
Working time calculation sheet
Definition of points of interest

- Buildings - apartment buildings
- Buildings – Detached houses
- Shops
- Offices
- Points of contact specificities
- Route specificities
Statistics
(data collection in March & October)

- First and second priority simple mail
- Partial sorting
- Batch ail arrivals (key accounts)
- Specially managed items
- Third-party financials
- Postal money orders
Area commerciability

- **COMMERCIAL COVERAGE E1,2,3**
  \[ E = \text{Number of items} / \text{apartments} + \text{shops} + \text{offices} \geq 1 \]

- **URBAN COVERAGE A1,2,3**
  \[ A = 1 > \text{Number of items} / \text{apartments} + \text{shops} + \text{offices} \geq 0.5 \]

- **SEMI-URBAN COVERAGE H1,2,3**
  \[ E = \text{Number of items} / \text{apartments} + \text{shops} + \text{offices} < 0.5 \]
Density

\[ D = \frac{\text{Number of points of contact}}{100 \text{ meters}} \]

- \( D \leq 0.06 \) — moped
- \( D > 0.06 \) and \( D \times E \leq 0.06 \) — moped
- \( D > 0.06 \) and \( D \times E > 0.06 \) — foot
Route length from…. to ….

"Route length from…. to …." is the distance covered from the Office to the first Point of Contact and from the last Point of Contact to the Office.

Times per 100 meters:
- On foot............................1.25´
- By bicycle..........................0.80´
- By moped...........................0.35´
Route length within

"Route length within" shall mean the distance covered within the area to serve all Points of Contact

**Times per 100 meters:**

- On foot..........................1.25´
- By bicycle.........................0.80´
- By moped..........................0.35´

(time calculation relates to the commerciability)
Graduated rates of distribution recipients
Route length

The route length is calculated using a map measurer on the available map or is calculated using the measurement of the milometer.
Area mapping
Auxiliary sheet

The Auxiliary Sheet records in detail:

- All geographical - building data per Point of Contact - street and number (building plots, buildings, corner structures, etc) and a breakdown per client category (apartments, shops, offices)

- Specificities per Point of Contact (distance, steps) and route specificities (slopes, earth roads, steps)

Data mapping and stocktaking take place per Cluster of Points of Contact (faces of building blocks)
New area allocation

Distribution areas are always adapted to the limits of the Postal Zone taking into account geographical limits and accessibility.
Delivery area planning

- Maximum number of areas per Distribution Zone up to 4 areas
- On special occasions of geographical limits up to 5 areas
- Within the limits of urban areas with a prospect of residential development, the existence of a Distribution Zone with 2 or 3 areas is envisaged
GIS-based area mapping
Distribution zones
Distribution zones with area allocation
Postal item management cycle
Distribution organization:
  • Express/courier services
Critical factors in courier distribution

• Reliability
• Security
• Information
• Flexibility
• Rapid transport and services frequency
• Price of provided services
Critical factors in courier distribution

- Service Level Agreement
- Call centre
- Pick-up
- Courier voucher
- Working time calculation sheet
- Routing
Courier client service levels
## Order-taking form

<table>
<thead>
<tr>
<th>ΑΠΟΣΤΟΛΕΑΣ:</th>
<th>ΑΠΟ - ΕΩΣ:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Δ/ΝΗ:</td>
<td>ΤΗΛΕΦΩΝΟ:</td>
</tr>
<tr>
<td>ΕΝΤΟΛΕΑΣ:</td>
<td>ΟΡΟΦΟΣ:</td>
</tr>
<tr>
<td>ΠΡΟΟΡΙΣΜΟΣ:</td>
<td>AUTO □ MOTO □</td>
</tr>
<tr>
<td>ΤΕΜΑΧΙΑ: ΒΑΡΟΣ:</td>
<td>ΔΙΑΣΤΑΣΕΙΣ:</td>
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<td></td>
<td>ΠΕΡΙΕΧΟΜΕΝΟ:</td>
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### ΧΡΕΩΣΗ

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<th>ΜΕΤΡ. □</th>
<th>ΑΥΘ □</th>
<th>ΕΠΙΛΑΝΤ/ΛΗ ( )</th>
<th>EMS □</th>
</tr>
</thead>
<tbody>
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<td>ΧΠ □</td>
<td>ΠΙΣΤ. □</td>
<td>ΣΑΒ □</td>
<td>ΔΗΛΑΞΙΑ ( )</td>
<td>SPM □</td>
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<tr>
<td>ΤΡΙΤΟΥ ( )</td>
<td>ΚΩΔ.ΠΕΛ ( )</td>
<td>ΔΕΣΜ.ΟΡΑΣ □</td>
<td>... ...</td>
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### ΥΠΗΡΕΣΙΕΣ

### ΠΑΡΑΤΗΡΗΣΕΙΣ...

### ΗΜ/ΝΙΑ:....../....../......

ΩΡΑ ΠΑΡΑΓΓΕΛΙΑΣ: ...........

ΚΩΔ. ΥΠΑΛ: ...........
Order-taking flow chart
Courier services marking
Courier Centre workflow chart
Courier Centre workflow chart
Courier Centre workflow chart
Courier Centre workflow chart
Working time calculation sheet
## Courier working time calculation

<table>
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<tr>
<th>ΠΡΟΕΤΟΙΜΑΣΙΑ</th>
<th>ΑΡΙΘΜΟΣ ΑΝΤΙΚΕΙΜΕΝΩΝ</th>
<th>ΧΡΟΝΟΣ ΣΕ ΛΕΠΤΑ</th>
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<tr>
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<td>Αντικείμενα για διανομή</td>
<td>#ΑΝΑΦΕΡΟΝΤΑΙ</td>
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<tr>
<td>1.1</td>
<td>Σταθερός χρόνος (Ημ. έργ. X 30)</td>
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<td>30,0</td>
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<tr>
<td>1.3</td>
<td>ΣΥΝΟΛΟ</td>
<td>30,0</td>
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<tr>
<td>1.5</td>
<td>ΣΥΝΟΛΙΚΟΣ ΧΡΟΝΟΣ ΠΡΟΕΤΟΙΜΑΣΙΑΣ</td>
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<td>1.6</td>
<td>ΗΜΕΡΗΣΙΟΣ Μ.Ο.</td>
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<table>
<thead>
<tr>
<th>ΔΙΑΝΟΜΗ</th>
<th>ΑΡΙΘΜΟΣ Σ.Ε.</th>
<th>ΛΕΠΤΑ ΑΝΩΤΑΤΟ</th>
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<td>65</td>
<td>30,0</td>
<td>55</td>
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<td>165,0</td>
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<tr>
<td>2.2</td>
<td>Διανυθέτεται Km με Δίκυκλο</td>
<td>3,0</td>
<td>150,0</td>
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<tr>
<td>2.3</td>
<td>Διανυθέτεται Km με Αυτοκίνητο</td>
<td>0,0</td>
<td>0,0</td>
</tr>
<tr>
<td>2.4</td>
<td>Παραλαβές</td>
<td>10,0</td>
<td>35,0</td>
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<td>2.5</td>
<td>Επιδόσεις</td>
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<td>54,0</td>
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<td>2.6</td>
<td>Επιδόσεις ειδικών συμβολαίων</td>
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<td>404,0</td>
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<td>2.8</td>
<td>Προσόντια χρόνος 20% (Σε περίπτωση χρήσης αυτοκινήτου)</td>
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<td>0,0</td>
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<tr>
<td>2.9</td>
<td>Διαλέγεται</td>
<td>15,0</td>
<td>15,0</td>
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### Ημ. Χρ. 480

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<tr>
<td>3.2</td>
<td>480,0</td>
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- Μέση Οριαία Ταχύτητα σε Km: Διανυθέτεται Km με Δίκυκλο
- Χρόνος κάλυψης Km σε λεπτά
- Διανυθέτεται Km με Αυτοκίνητο
- Χρόνος κάλυψης Km σε λεπτά

- Μέση Οριαία Ταχύτητα σε Km: Διανυθέτεται Km με Δίκυκλο
- Χρόνος κάλυψης Km σε λεπτά
- Διανυθέτεται Km με Αυτοκίνητο
- Χρόνος κάλυψης Km σε λεπτά
Track & trace
Production process flow chart
Distribution work flow chart
Distribution work flow chart
Distribution work flow chart
Distribution work flow chart
Postal services logistics support technologies

- Sorting Centre Automation
- RFID
- GIS
- GPS
Infrastructure: Sorting Centre (hub) automation
Sorting centre equipment

- Conveyor belts
- Forklifts
RFID technology
RFID technology advantages

- Reduction of tracking time
- Rapid, automatic and safe data recording
- Easier search
- Warehousing procedures improvement
- Potential for data entry into RFID readers
- No visual contact with RFID reader necessary
- Simultaneous reading of multiple items by RFID readers
Forecast average cost of RFID technology
GPS - Architecture
GPS – User interface
Logistics - Postal services

- Problems
- Prospects
Problems of courier services logistics

• Vehicle Routing Problems

• Vehicle Scheduling Problems

• Vehicle Routing and Scheduling Problems
End-to-end courier services management

- Item pickup
- Data management
- Packaging
- Form and voucher digitization, filing and recovery
- Return management
- Item preparation for routing and distribution
- Supervision and order management coordination
- Classification and distribution
- Receipts
- Reporting
Postal services logistics - Trends

Competition:
- Expansion of international companies
- Local courier/ city services
- Group correspondence special companies
- Own customer delivery systems

Client needs
- Value added services
- Quality improvement
- Guaranteed delivery - speed - low cost
- Price sensitivity

Regulatory framework
- End of monopolies
- Unclear requirements of universal service
- Disproportional price regulation
- Access to network by competitors

Technologies
- E-correspondence
- E-commerce
Logistics services provider
(A case of postal services logistics)

- DHL: owned by Deutsche Post World Net
- Operating in 220 countries
- It is a market leader: sets global standards
- Focus on postal and courier services
- More than 8,000,000 clients
- >350 privately-owned aircraft
Logistics - Postal services:
Present and future
Present: production and distribution traditional method

The manufacturer produces the product

The manufacturer stores the product

The manufacturer transports the product to the retail point of sale or the distribution centre

The manufacturer stores the product

The retail point of sale orders products

The retail point of sale orders products
Present: The case of Amazon.com