

**МИНИСТЕРСТВО ОБРАЗОВАНИЯ РЕСПУБЛИКИ БЕЛАРУСЬ**  
**УЧРЕЖДЕНИЕ ОБРАЗОВАНИЯ**  
**«БРЕСТСКИЙ ГОСУДАРСТВЕННЫЙ ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ»**

**КАФЕДРА ИНОСТРАННЫХ ЯЗЫКОВ**  
**ПО ЭКОНОМИЧЕСКИМ СПЕЦИАЛЬНОСТЯМ**

# **Fundamentals of Logistics**

**Методические рекомендации**  
**по дисциплине «Иностранный (английский) язык»**  
**для студентов специальности 10 – 26 02 05 «Логистика»**

Брест 2016

УДК 811.111  
ББК 81.2 Англ

Методические рекомендации составлены в соответствии с Учебной программой по специальности 1 – 26 26 02 05 «Логистика» для студентов факультета заочного обучения и факультета инновационной деятельности, управления и финансов.

Основная цель – подготовить студентов к использованию английского языка в будущей профессиональной деятельности. Учебно-методическое пособие направлено на обучение студентов лексике, используемой в сфере логистических операций, формирование навыков чтения и говорения.

Составители: Резько П.Н., старший преподаватель кафедры иностранных языков УО «Брестский государственный университет имени А.С. Пушкина», канд. пед. наук

Рахуба В.И., заведующий кафедрой иностранных языков по экономическим специальностям УО «Брестский государственный технический университет», канд. филол. наук, доцент

Рецензент: Сальникова Е.Г. зав. кафедрой лингводидактики УО «Брестский государственный университет имени А.С. Пушкина», канд. филол. наук, доцент

## Contents

### **Part I.**

Text 1. What is Logistics? .....	4
Text 2. Distribution Centres (Part I).....	7
Text 3. Distribution Centers (Part II) .....	11
Text 4. Software and Hardware Logistic Application .....	14
Text 5. Supply Chain Management.....	18
Text 6. The Third-Party Logistics .....	22
Text 7. Transportation .....	26
Text 8. Logistics Documentation (Part I).....	31
Text 9. Logistics Documentation (Part II) .....	35
Text 10. Reverse Logistics .....	38
Text 11. My Future Profession (logistician) .....	40

### **Part II.**

Supplementary Reading .....	42
Creative Solutions .....	55
List of Abbreviations.....	59
List of Proper Names Used in the Booklet.....	59
References .....	62

## Part I.

### *Text 1.*

#### What is Logistics?

**Logistics** is the management of the flow of goods between the point of origin and the point of consumption in order to meet some requirements, of customers or corporations. Logistics is the detailed organization and implementation of a complex operation. The resources managed in logistics can include physical items, such as food, materials, animals, equipment and liquids, as well as abstract items, such as time, information, particles, and energy. The logistics of physical items usually involves the integration of information flow, material handling, production, packaging, inventory, transportation, warehousing, and often security. The complexity of logistics can be modeled, analyzed, visualized, and optimized by dedicated simulation software. The minimization of the use of resources is a common motivation in logistics for import and export. One definition of business logistics speaks of "having the right item in the right quantity at the right time at the right place for the right price in the right condition to the right customer".

Logistics includes the integrated planning, control, realization, and monitoring of all internal and network-wide material, part, and product flow, including the necessary information flow, industrial and trading companies along the complete value-added chain (and product life cycle) for the purpose of conforming to customer requirements.

The prevalent view is that the term *logistics* comes from the late 19th century: from French *logistique* (*loger* means *to lodge*). Others attribute a Greek origin to the word "logisticos" meaning accountant or responsible for counting. Logistics has its root from the military activities associated with moving troops into the battlefield. Later, the application has moved into business field. In military science, maintaining one's supply lines while disrupting those of the enemy is a crucial – some would say the most crucial – element of military strategy, since an armed force without resources and transportation is defenseless. The defeat of the British in the American War of Independence and the defeat of Napoleon in French-Russian war 1812 are attributed by some scholars to logistical failures. The historical leaders Hannibal Barca, Kutuzov and Alexander the Great are considered to have been logistical geniuses.

The term "business logistics" has evolved since the 1960s due to the increasing complexity of supplying businesses with materials and shipping out products in an increasingly globalized supply chain, leading to a call for professionals called "supply chain logisticians". Business logistics incorporates all industry sectors and aims to manage the fruition of project life cycles, supply chains, and resultant efficiencies.

Traditionally in logistics configuration may be at the level of the warehouse (node) or at level of the distribution system (network).

Regarding a single warehouse, besides the issue of designing and building the warehouse, configuration means solving a number of interrelated technical-economic problems: dimensioning rack cells, choosing a palletizing method (manual or through robots), rack dimensioning and design, number of racks, number and typology of retrieval systems (e.g. stacker cranes). Some important constraints have to be

satisfied: fork and load beams resistance to bending and proper placement of sprinklers. Although picking is more of a tactical planning decision than a configuration problem, it is important to take it into account when deciding the racks layout inside the warehouse and buying tools such as handlers and motorized carts since once those decisions are taken they will work as constraints when managing the warehouse, same reasoning for sorting when designing the conveyor system and/or installing automatic dispensers.

Configuration at the level of the distribution system concerns primarily the problem of location of the nodes in a geographic space and distribution of capacity among the nodes. The first may be referred to as facility location (with the special case of site selection) while the latter to as capacity allocation. The problem of outsourcing typically arises at this level: the nodes of a supply chain are very rarely owned by a single enterprise. Distribution networks can be characterized by numbers of levels, namely the number of intermediary nodes between supplier and consumer:

- Direct store delivery, i.e. zero levels
- One level network: central warehouse
- Two level network: central and peripheral warehouses

This distinction is more useful for modeling purposes, but it relates also to a tactical decision regarding safety stocks: considering a two level network, if safety inventory is kept only in peripheral warehouses then it is called a dependent system (from suppliers), if safety inventory is distributed among central and peripheral warehouses it is called an independent system (from suppliers). Transportation from producer to the second level is called primary transportation, from the second level to consumer is called secondary transportation.

Although configuring a distribution network from zero is possible, logisticians usually have to deal with restructuring existing networks due to presence of an array of factors: changing demand, product or process innovation, opportunities for outsourcing, change of government policy toward trade barriers, innovation in transportation means (both vehicles or thoroughfares), introduction of regulations (notably those regarding pollution) and availability of ICT supporting systems (e.g. e-commerce).

Once a logistic system is configured, management, meaning tactical decisions, takes place, once again, at the level of the warehouse and of the distribution network. Decisions have to be made under a set of constraints: internal, such as using the available infrastructure, or external, such as complying with given product shelf lives and expiration dates.

There are two fundamentally different forms of logistics: one optimizes a steady flow of material through a network of transport links and storage nodes, while the other coordinates a sequence of resources to carry out some project(ex: restructuring a warehouse). As such, logistics is commonly seen as a branch of engineering that creates "people systems" rather than "machine systems."

In business, logistics may have either an internal focus (inbound logistics) or an external focus (outbound logistics), covering the flow and storage of materials from point of origin to point of consumption (see supply-chain management). The

main functions of a qualified logistician include inventory management, purchasing, transportation, warehousing, consultation, and the organizing and planning of these activities. Logisticians combine a professional knowledge of each of these functions to coordinate resources in an organization. Logistics management is that part of the supply chain that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services, and related information between the point of origin and the point of consumption in order to meet customer requirements. A professional working in the field of logistics management is called a *logistician*.

Ex.1. Answer the questions. 1. What is the origin of the term logistics? 2. What can you tell about the history of Logistics? 3. What does the term business logistics mean? 4. How many levels of logistics do you know? What are they? 5. What does logistics create?

Ex.2 Find in the right column the English equivalents to the following words.

- |                   |               |
|-------------------|---------------|
| 1. сеть           | a. consumer   |
| 2. склад          | b. customer.  |
| 3. безопасность   | c. demand     |
| 4. дозатор        | d. dispenser  |
| 5. закупки        | e. location   |
| 6. клиент.        | f. network    |
| 7. обеспечивать   | g. node       |
| 8. поставщик      | h. purchasing |
| 9. потребитель    | i. security   |
| 10. расположение  | j. supplier   |
| 11. снабжать      | k. to provide |
| 12. спрос         | l. to supply  |
| 13. узловой пункт | m. warehouse  |

Ex.3. Complete the sentences using the words from the box

provide	storage	support	distribution	delivery	maintenance
---------	---------	---------	--------------	----------	-------------

1. Logistics means that you manage the procurement and movement of goods and the \_\_\_\_\_ of inventory.
2. It means the \_\_\_\_\_ of the goods the customer needs at the right time, in the right place, and of the right quality.
3. My definition of *logistics* is this: it's to plan, organize, and manage operations that \_\_\_\_\_ services and goods.
4. *Logistics* - that's the purchasing, maintenance, \_\_\_\_\_, and replacement of material and staff.
5. *Logistics* is the planning and \_\_\_\_\_ of operations such as warehousing, inventory, transport, procurement, supply, and \_\_\_\_\_.

Ex. 4. Complete the following table using the words from the exercise.

<i>Verb</i>	<i>Noun</i>
to provide	
	storage
to support	
	delivery
	distribution
to maintain	
	transportation
	purchasing

Ex. 5. Match the definitions (a-f) with the words (1-6) below.

1. carrier
2. freight forwarder
3. supplier
4. haulage contractor
5. courier
6. consignee

- a. company which carries goods by road
- b. person or firm named in a freight contract to whom goods have been shipped or turned over for care
- c. company that specializes in the speedy and secure delivery of small goods and packages
- d. company that transports or conveys goods
- e. company which supplies parts or services to another company; also called vendor
- f. person or business that arranges documentation and travel facilities for companies dispatching goods to customers

### ***Text 2.***

#### **Distribution Centres (Part I)**

A distribution center for a set of products is a warehouse or other specialized building, often with refrigeration or air conditioning, which is stocked with products (goods) to be redistributed to retailers, to wholesalers, or directly to consumers. A distribution center is a principal part, the order processing element, of the entire order fulfillment process. Distribution centers are usually thought of as being demand driven. A distribution center can also be called a warehouse, a DC, a fulfillment center, a cross-dock facility, a bulk break center, and a package handling center. The name by which the distribution center is known is commonly based on the purpose of the operation. For example a "retail distribution center" normally distributes goods to retail stores, an "order fulfillment center" commonly distributes goods directly to consumers, and a cross-dock facility stores little or no product but distributes goods to other destinations.

Distribution centers are the foundation of a supply network, as they allow a single location to stock a vast number of products. Some organizations operate both retail distribution and direct-to-consumer out of a single facility, sharing space, equipment, labor resources, and inventory as applicable.

A typical retail distribution network operates with centers set up throughout a commercial market, with each center serving a number of stores. Large distribution centers for companies such as Wal-Mart serve 50–125 stores. Suppliers ship truckloads of products to the distribution center, which stores the product until needed by the retail location and ships the proper quantity.

Since a large retailer might sell tens of thousands of products from thousands of vendors, it would be impossibly inefficient to ship each product directly from each vendor to each store. Many retailers own and run their own distribution networks, while smaller retailers may outsource this function to dedicated logistics firms that coordinate the distribution of products for a number of companies. A distribution center can be co-located at a logistics center.

A large distribution center might receive and ship more than ten thousand truckloads each year, with an individual store receiving from only a couple trucks per week up to 20, 30, or more per week. Distribution centers range in size from less than 50,000 square feet (5,000 m<sup>2</sup>) to the largest approaching 3 million square feet (300,000 m<sup>2</sup>).

Although the primary role of a distribution center is to receive large quantities of products and ship small quantities to individual stores, an important secondary role is storage. Many retailers give priority to having as many items in stock at once as possible. To conserve space, minimize inventory costs, and maximize the variety they offer, the retailer might stock only one or a few items of a particular product. This requires the ability to ship a replacement quickly once an item is sold. By keeping product on hand in the distribution center, the retailer can ship a replacement almost immediately after a product is sold.

Goods (products) arrive and are stored in a distribution center in varying types of storage locations and containers suited to the product characteristics and the amount of product to be transported or stored. These types of locations and containers have specific industry-accepted names. Specialized pieces of equipment (material handling equipment, or MHE) are used to handle the various types of containers. The following is a list of some of the names and characteristics of common storage containers:

- ◆ Intermodal containers (shipping containers) are used for the efficient transportation of goods. Standards specify the volume and dimensions of containers to facilitate efficient handling.

- ◆ Pallets are one of the most commonly used means to store and move product in a distribution center. There are many specialized devices (material handling equipment or MHE) used to handle pallets - see forklift truck, pallet jack, pallet inverter, and unit load ....Automated Storage and Retrieval Systems (ASRS). Pallets are stored on the floor, may be stacked, and may be stored in pallet racking.

- ◆ Gaylords are large single boxes usually connected or attached to a pallet.



◆ Cases and Cartons are boxes usually containing many items. In distribution centers there is a generally accepted distinction made between the terms "carton" and "case", although both are boxes. Goods are received and stored in cartons, while goods are shipped in cases. A stored carton is called a case once it has been picked or pulled for shipment.

◆ Totes are reusable containers used to hold and transport goods.

In addition to shipping quickly, preparing for busy shopping seasons requires retailers to stock up on product ahead of time. For most retailers, the Christmas shopping season is the busiest of the year. Ahead of this time, a distribution center might double the amount of inventory on hand and then draw this level down through the shopping season. This strategy is especially important for imported items. With lead times measured in weeks or months, stocking these products in a distribution center is often the only way to maintain in-stocks at the store. New seasons, holidays, or special promotions may also prompt a retailer to store specific items prior to a large rollout or demand forecast.

Another way to look at a distribution center is to see it as a production or manufacturing operation. Goods arrive in bulk, they are stored until needed, retrieved, and assembled into shipments. The efficient processing of a distribution center can greatly impact the final price of the product delivered to the end user. Efficient processing not only directly impacts the cost of goods through reduced labor, but it also indirectly impacts the cost of goods through reduced inventory. Inventory represents an investment with its associated investment interest or inventory carrying cost. Reducing the processing time of order processing can directly reduce the amount of inventory necessary to be stocked in the operation (see demand chain management).

The most efficient method of distribution would be to ship a full truckload or railcar directly from the manufacturer to the retailer. The next most efficient method would be to ship a full truckload to a distribution center, unload full pallets of products, and immediately load the pallets onto trucks destined for individual stores. Both of these methods can only be used on very high-volume items. Most products cannot be delivered in this manner, and pallets or even individual boxes must be broken down and divided.

Once a full pallet must be broken apart, the costs of handling the product can increase quickly. Many distribution centers use large sortation systems with miles of conveyor to move products through the facility and into a truck. They may also have automated equipment for de-palletizing and re-palletizing product. Some of the most sophisticated systems can convey product directly into storage racks and then convey out of the racks to trucks, all automatically. With a wide variety of product sizes and weights, these systems are designed to handle a specific range of products. Very large, small, heavy, or light products require varying degrees of manual handling.

As the process of handling involves more steps and becomes increasingly manualized, the cost increases. Storing products instead of receiving and immediately shipping them adds cost. Firms must determine when lost sales due to not having product on the shelves are balanced by increased handling and storage costs.

All distribution centers have three main areas and may have additional specialized areas. The three main areas are the receiving dock, the storage area, and the shipping dock. In small organizations it is possible for the receiving and shipping functions to occur side by side, but in large centers, separating these areas simplifies the process. Many distribution centers have dedicated dock doors for each store in their shipping area. The receiving area can also be specialized based on the handling characteristics of freight being received, on whether the product is going into storage or directly to a store, or by the type of vehicle delivering the product.

A number of components go into the overall planning of a distribution center in order to maximize its efficiency. If the distribution center relies on a conveyor system suspended from the ceiling, consideration needs to be given to the weight-bearing capacity of the ceiling joists. If the conveyor system runs along the floor, then consideration needs to be given in the design stage to the placement of columns, particularly as they relate to the flue space between pallet rack frames. Other planning considerations include attention to such areas as slotting, product replenishment, storage media, and power requirements.

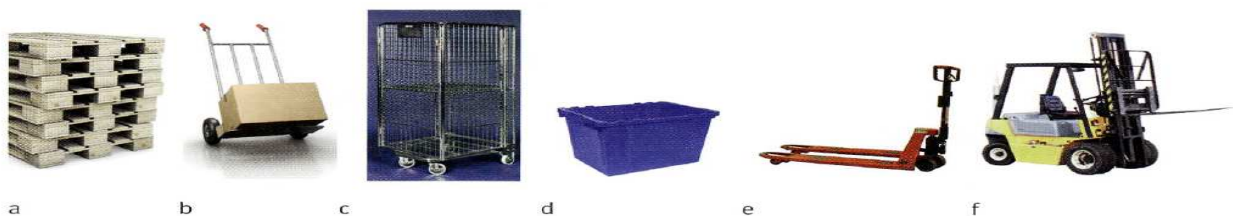
Ex.1. Answer the questions.

1. What is the main difference between retail distribution center and fulfillment center? 2. What do you think about direct-to-consumer selling? 3. Why do transport companies use pallets? 4. What are gaylords? 5. What is the busiest shopping season?

Ex.2. Put the words in the right order. Use the correct form of the words.

1. an excellent / provide / delivery service / my company.
2. you / how much / handle / cargo / per year ?
3. to other countries / not ship / we / chemical products.
4. responsible for / be / the warehouse manager / also / vehicles and machinery.
5. to foreign companies / car parts / this vendor / supply ?
6. usually / arrange / for companies / a freight forwarder / documentation

Ex.3. Look at the pictures of warehouse equipment. Match the pictures (a-f) with the words (1-6)



1. hand pallet-truck
2. tote bin
3. fork-lift truck (CB truck)
4. roll-cage pallet
5. (Euro pallet or UK) pallet
6. trolley

Ex.4. Read the text describing warehouse areas and label the areas with words from the box.

sortation	marshalling and dispatch	back-up storage
order picking	receiving	collation and value-added services

First of all, there is the \_\_\_\_\_ area. That's where all incoming goods arrive and documentation is checked and recorded. Goods are often unpacked or repacked here to make their format more suitable for warehouse handling.

The \_\_\_\_\_ area holds most of our warehouse inventory.

In the \_\_\_\_\_ area the goods are selected in the right quantities, that means the quantities required by the customer. Here we also break bulk. That means, for example, after receiving goods in large quantities (e.g. pallets), we need to pack them in smaller separate units for the customer.

In the \_\_\_\_\_ area we deal with smaller order sizes. Sometimes several orders have been batched together to simplify the picking process and now need to be sorted down to individual orders.

After picking, the goods are consolidated and made ready for dispatch. Depending on the customer's requirements the goods may be packed into cartons or cases or they are wrapped (i.e. stretch-wrapping or shrink-wrapping). Some warehouses also provide special services such as labeling. This part of warehouse operations is called \_\_\_\_\_.

The final stage in warehouse operations is the \_\_\_\_\_ area. The goods are brought together to form vehicle loads and are then loaded onto vehicles for onward dispatch.

## Distribution Centres (Part II)

Ex.1. Read the text and outline the services of distribution centers.

Because many distribution centers service both large and small clients, especially those which store a specific type of service as opposed to those which serve a specific company, roles and departments are generally more complicated. A simple distribution center which serves many clients of a specific theme or type of service may include:

- Goods in: Usually containing specialized container unloading equipment and workers, including pallet wrapping, conveyor belt unloaders (as used on 40 ft shipping containers), forklift drivers, and administrative staff
- Bulk: As a rule, a bulk department controls and ships larger orders or orders that contain only full cartons/boxes. A bulk department includes forklift truck drivers to load containers and wagons, and *man-up* or *combi* forklift trucks to unload full pallets from warehouse racking.

- **Break-bulk:** Break-bulk (also known as split case) is a lower-capacity version of the *bulk* department. Orders usually contain part boxes or items not requiring pallets. Due to the number of smaller customers a distribution center may serve, a break-bulk department may need more workers than a bulk department. A break-bulk department usually uses trolleys or, for palletted/heavy orders, small electric *PPT* or *walkie low lift* trucks. Items shipped by break-bulk are usually stored in *pick*, which are usually the bottom two *pick-faces* of warehouse racking. A pick-face is the space on such a racking system onto which a pallet can be loaded.

- **Export:** An export department controls orders which are leaving the country of the distribution center. This department is almost identical in function to a bulk or break-bulk department; however, workers in this department build pallets conforming to different standards and sizes. An export department also uses different shipping containers or haulage firms.

- **Quality assurance:** A quality assurance (*QA*) department performs periodic checks of random samples of stock to check quality, including from the warehouse racking, goods in, and returned stock. This department may also take on cycle count duties to find missing stock.

- **Administration**

- **Packing and production:** In many distribution centers it is not feasible to store stock in many different packaging styles or quantities, and while it may cost a customer more to do so, many customers, such as supermarkets, prefer their own packaging on stock. Because of this, packing benches are used to take raw items, such as a box of balloons, and pack them at a specific unit quantity, which are then packed into cartons and labeled accordingly for a customer. In many circumstances this may be more inexpensively done at a distribution center than by a customer or client.

- **Transportation:** Arranges and coordinates shipments in and out of the distribution center.

- **Dedicated product departments:** Divisions may be based on handling characteristics or storage characteristics, for example, refrigerated and non-refrigerated [meat and produce, frozen, dairy/deli, dry]. Each of these three areas have both shipping and receiving departments as well.

Ex.2. Read the text and outline jobs of distribution centers.

Distribution centers also have a variety of supporting departments, including human resources, maintenance/facilities operations, production control, and accounting. A distribution center typically has a general manager who manages the facility and typically has a number of department managers who report directly to him/her. Most distribution centers divide staff into two categories, direct labor and indirect labor. Direct labor staff execute the distribution processes, while indirect labor staff support the direct labor staff. Each department is in turn composed of supervisors and warehouse workers. The direct labor jobs of a warehouse can include:

- **Unloader** - unloads trucks and breaks down pallets as needed, using various pieces of power equipment

- Receiver - inventories and tags unloaded pallets using a mobile cart computer unit and printer
  - Hauler - transports received pallets with equipment from the receiving dock to the storage racks
  - Putaway driver - puts product into racks with forklift
  - Lumper - helps unload shipments
  - Replenishment driver - pulls product from the racks and places it into the "pick slot" with forklift
  - Order filler - picks product from the "pick slot" by hand and moves with power equipment
  - Loader - wraps the order-filled pallets and loads trucks, using equipment
- Indirect labor departments and jobs within a warehouse can include:
- Supervision - floor (process) supervision, indirect labor supervision
  - Human resources - employment office and employee benefits
  - Facilities and housekeeping - maintenance of buildings
  - Inventory management - tracking and placement of product
  - Quality assurance - inspection and acceptance of incoming and outbound product
  - Asset protection - building security and loss prevention
  - Safety - insurance of safe operating practices
  - Equipment maintenance - electrical, mechanical, and pneumatic maintenance of MHE
  - Operations research - Industrial engineering, process improvement, labor standards
  - Information technology - support of information systems
  - Water Spider - replenishes cardboard, bubble wrap, tape, etc. for warehouse packers

Ex.3. Match the warehouse areas (1-5) to the activities that take place in them (a-e).

1. dispatch
2. collation
3. reserve storage
4. order picking and sortation
5. receiving

- a. goods are brought together for loading and transport
- b. where the goods are kept until required
- c. the goods are selected and put together in the units required by the customer
- d. complete orders are packed and wrapped
- e. the goods are prepared for warehouse operations

Ex.4. Match the verbs (1-8) from the text in exercise 1 to the correct definitions (a-h).

1. label	a. put goods on a pallet or vehicle
2. repack	b. provide specific information on the product itself or the packaging
3. handle	c. deal with
4. select	d. pick or choose
5. batch	e. put several things together
6. sort	f. pack in special material for protection
7. wrap	g. put into new units or formats
8. load	h. arrange in a special way or order

Ex.5. Work with a pairs. Suppose, each of you has a warehouse management system. Present the advantages of your system to your partner.

### *Text 3.*

#### **Software and Hardware Logistic Application**

Software and hardware logistic application is called Logistics automation. It is used to improve the efficiency of logistics operations. Typically this refers to operations within a warehouse or distribution center, with broader tasks undertaken by supply chain management systems and enterprise resource planning systems. Logistics automation systems can powerfully complement the facilities provided by these higher level computer systems. The focus on an individual node within a wider logistics network allows systems to be highly tailored to the requirements of that node.

Hardware components are fixed and mobile. Fixed machinery are following:

- Automated cranes (also called automated storage and retrieval systems): provide the ability to input and store a container of goods for later retrieval. Typically cranes serve a rack of locations, allowing many levels of stock to be stacked vertically, and allowing far high storage densities and better space utilization than alternatives.

- Conveyors: automated conveyors allow the input of containers in one area of the warehouse, and either through hard coded rules or data input allow destination selection. The container will appear at the selected destination.

- Sortation, or sorting systems: similar to conveyors but typically have higher capacity and can divert containers more quickly. Typically used to distribute high volumes of small cartons to a large set of locations.

- Industrial robots: four to six axis industrial robots, e.g. palleting robots, are used for palleting, depalleting, packaging, commissioning and order picking.

- Typically all of these will automatically identify and track containers based upon barcodes, or increasingly, RFID tags

- AS/RS — Automated Storage and Retrieval Systems. Vertical Carousels based on the paternoster system or with space optimization, these can be thought of as large scale vending machines, giving the same easy access to physical objects as we have become accustomed to with respect to data.

- Motion check may be used to reject cases or individual products by checking them for underweight conditions and rejecting the item. They are often used in kitting conveyor lines to ensure all pieces belonging in the kit are present. Large wholesalers and retail club stores insist on receiving the exact amount of product in each package as specified.

Mobile technology are presented mostly by Radio data terminals: these are hand held or truck mounted terminals which connect by wireless to logistics automation software and provide instructions to operators moving throughout the warehouse. Many also have in-built bar code scanners to allow identification of containers. Bar codes allow the automatic capture of data without use of the computer keyboard, which is slow and error prone.

Logistic software could be:

- Integration software: this provides overall control of the automation machinery and for instance allows cranes to be connected to conveyors for seamless stock movements.

- Operational control software: provides low-level decision making, such as where to store incoming containers, and where to retrieve them when requested.

- Business Control software: provides higher level functionality, such as identification of incoming deliveries / stock and scheduling order fulfillment, assignment of stock to outgoing trailers.

Logistics automation has several benefits. A typical warehouse or distribution center will receive stock of a variety of products from suppliers and store these until the receipt of orders from customers, whether individual buyers (e.g. mail order), retail branches (e.g. chain stores), or other companies (e.g. wholesalers). A logistics automation system may provide the following:

- Automated goods in processes: Incoming goods can be marked with barcodes and the automation system notified of the expected stock. On arrival, the goods can be scanned and thereby identified, and taken via conveyors, sortation systems, and automated cranes into an automatically assigned storage location.

- Automated Goods Retrieval for Orders: On receipt of orders, the automation system is able to immediately locate goods and retrieve them to a pick-face location.

- Automated dispatch processing: Combining knowledge of all orders placed at the warehouse the automation system can assign picked goods into dispatch units and then into outbound loads. Sortation systems and conveyors can then move these onto the outgoing trailers.

- If needed, repackaging to ensure proper protection for further distribution or to change the package format for specific retailers/customers.

A complete warehouse automation system can drastically reduce the workforce required to run a facility, with human input required only for a few tasks, such as picking units of product from a bulk packed case. Even here, assistance can be provided with equipment such as pick-to-light units. Smaller systems may only be required to handle part of the process. Examples include automated storage and retrieval systems, which simply use cranes to store and retrieve identified cases or pallets,

typically into a high-bay storage system which would be unfeasible to access using fork-lift trucks or any other means.

Software or cloud-based SaaS solutions are used for logistics automation which helps the supply chain industry in automating the workflow as well as management of the system. There are few generalized software available in the new market in the said topology. This is because there is no rule to generalize the system as well as work flow even though the practice is more or less the same. Most of the commercial companies do use one or the other of the custom solutions.

But there are various software solutions that are being used within the departments of logistics. There are a few departments in Logistics, namely: Conventional Department, Container Department, Warehouse, Marine Engineering, Heavy Haulage, etc.

*Ex.1. Answer the questions*

1. Why do we use logistics automation?
2. What are the main tools of logistics hardware?
3. How mobile technologies are presented in logistics?
4. What types of logistics software do you know?
5. How cloud-based software is used in logistics?

*Ex.2 Find in the left column the English equivalents to the following words.*

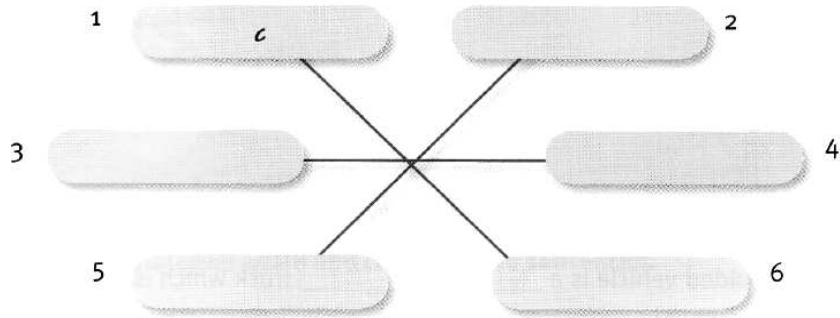
- |                |                           |
|----------------|---------------------------|
| 1. crane       | a. услуги                 |
| 2. facilities  | b. машинное оборудование  |
| 3. fulfillment | c. требование             |
| 4. machinery   | d. кран                   |
| 5. requirement | e. оптовая торговля       |
| 6. wholesale   | f. выполнение             |
| 7. haulage     | g. буксировка (перевозка) |

*Ex. 3. Complete the sentences using the correct active or passive form of the verbs in brackets.*

1. After the unit load \_\_\_\_\_ (check), it goes into automated storage.
2. As soon as an appropriate location \_\_\_\_\_ (identify) by the warehouse management system, a put-away instruction \_\_\_\_\_ (must, issue).
3. After the vehicle driver \_\_\_\_\_ (report) to the gatehouse, the vehicle documentation \_\_\_\_\_ (check) by staff.
4. Then the packages \_\_\_\_\_ (process) i.e. they (may, label) with bar codes.
5. The goods \_\_\_\_\_ (check) on unloading.
6. After that, staff \_\_\_\_\_ (direct) the driver to an unloading bay or a parking area.



Now put the steps in the goods receiving process in the correct order 1-6.

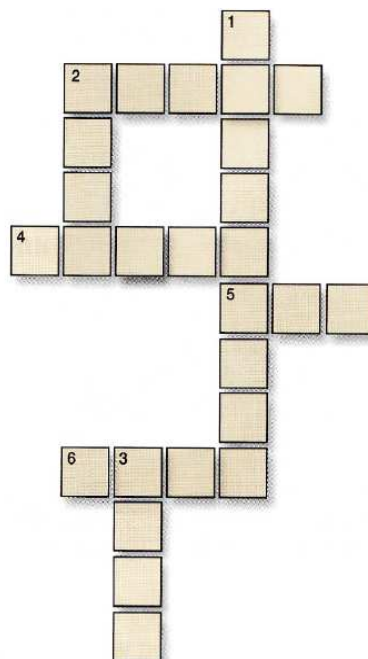


Ex.4. Complete the descriptions of typical warehouse equipment and systems. Use the adjectives from the box.

stackable	mobile	adjustable	suitable	bulky	driverless	rigid	collapsible
-----------	--------	------------	----------	-------	------------	-------	-------------

1. \_\_\_\_\_ An automated guided vehicle is a \_\_\_\_\_ truck which is controlled by computer and electrically powered.
2. \_\_\_\_\_ IBCs (intermediate bulk containers) made of metal or plastic are \_\_\_\_\_, but there are also ones made of canvas, which are \_\_\_\_\_.
3. Cage and box pallets are fitted with corner-posts and sides. They are usually \_\_\_\_\_.
4. In palletized storage APR, i.e. \_\_\_\_\_ pallet racking, is used.
5. \_\_\_\_\_ Some products are not \_\_\_\_\_ for palletization e.g. expensive electronic items or large and \_\_\_\_\_ items.
6. \_\_\_\_\_ shelving is often used for smaller products in non-palletized systems.

Ex.5. Complete this crossword with words from the unit.



### *Across*

- 2 Keep goods in a warehouse.
- 4 Put on top of each other.
- 5 Container for smaller products.
- 6 Select the right items.

### *Down*

- 1 Form smaller units from larger units (2 words - 5, 4).
- 2 Put into the right order or package.
- 3 Another word for article or piece.

### *Text 5.*

## **Supply Chain Management**

One of the most confusing thing is the difference between logistics and supply chain management. The logistics involves planning, implementing and controlling efficient, effective flow and storage of goods and services from the beginning point of external origin to the company and from the company to the point of consumption for the purpose of conforming to customer requirements. Logistics is generally viewed as within one company, although it manages flow between company and its suppliers and customers. Supply chain management includes logistics flows, the customer order management and production processes and information flows necessary to monitor all activities at the supply chain nodes.

Supply Chain Management (SCM) is the management of the flow of goods and services. It includes the movement and storage of raw materials, work-in-process inventory, and finished goods from point of origin to point of consumption. Interconnected or interlinked networks, channels and node businesses are involved in the provision of products and services required by end customers in a supply chain. Supply chain management has been defined as the design, planning, execution, control, and monitoring of supply chain activities with the objective of creating net value, building a competitive infrastructure, leveraging worldwide logistics, synchronizing supply with demand and measuring performance globally.

SCM draws heavily from the areas of operations management, logistics, procurement, and information technology, and strives for an integrated approach. The term "supply chain management" entered the public domain when Keith Oliver, a consultant at Booz Allen Hamilton (now Strategy&), used it in an interview for the Financial Times in 1982. The term was slow to take hold. It gained currency in the mid-1990s, when a flurry of articles and books came out on the subject. In the late 1990s it rose to prominence as a management buzzword, and operations managers began to use it in their titles with increasing regularity.

A supply chain, as opposed to supply chain management, is a set of organizations directly linked by one or more upstream and downstream flows of products, services, finances, or information from a source to a customer. Supply chain management is the management of such a chain.

Supply chain management software includes tools or modules used to execute supply chain transactions, manage supplier relationships, and control associated business processes. Supply chain event management (SCEM) considers all possible events and factors that can disrupt a supply chain. With SCEM, possible scenarios can be created and solutions devised. In many cases the supply chain includes the collection of goods after consumer use for recycling. Including third-party logistics or other gathering agencies as part of the RM repatriation process is a way of illustrating the new endgame strategy.

Supply chain management is a cross-functional approach that includes managing the movement of raw materials into an organization, certain aspects of the internal processing of materials into finished goods, and the movement of finished goods out of the organization and toward the end consumer. As organizations strive to focus on core competencies and becoming more flexible, they reduce their ownership of raw materials sources and distribution channels. These functions are increasingly being outsourced to other firms that can perform the activities better or more cost effectively. The effect is to increase the number of organizations involved in satisfying customer demand, while reducing managerial control of daily logistics operations. Less control and more supply chain partners led to the creation of the concept of supply chain management. The purpose of supply chain management is to improve trust and collaboration among supply chain partners, thus improving inventory visibility and the velocity of inventory movement.

There are several processes in supply chain management:

*a) Customer service management process*

Customer relationship management concerns the relationship between an organization and its customers. Customer service is the source of customer information. It also provides the customer with real-time information on scheduling and product availability through interfaces with the company's production and distribution operations. Successful organizations use the following steps to build customer relationships: determine mutually satisfying goals for organization and customers establish and maintain customer rapport induce positive feelings in the organization and the customers

*b) Procurement process*

Strategic plans are drawn up with suppliers to support the manufacturing flow management process and the development of new products. In firms whose operations extend globally, sourcing may be managed on a global basis. The desired outcome is a relationship where both parties benefit and a reduction in the time required for the product's design and development. The purchasing function may also develop rapid communication systems, such as electronic data interchange (EDI) and Internet linkage, to convey possible requirements more rapidly. Activities related to obtaining products and materials from outside suppliers involve resource planning, supply sourcing, negotiation, order placement, inbound transportation, storage, handling, and quality assurance, many of which include the responsibility to coordinate with suppliers on matters of scheduling, supply continuity, hedging, and research into new sources or programs.

*c) Product development and commercialization*

Here, customers and suppliers must be integrated into the product development process in order to reduce the time to market. As product life cycles shorten, the appropriate products must be developed and successfully launched with ever-shorter time schedules in order for firms to remain competitive.

*d) Manufacturing flow management process*

The manufacturing process produces and supplies products to the distribution channels based on past forecasts. Manufacturing processes must be flexible in order to respond to market changes and must accommodate mass customization. Orders are processes operating on a just-in-time (JIT) basis in minimum lot sizes. Changes in the manufacturing flow process lead to shorter cycle times, meaning improved responsiveness and efficiency in meeting customer demand. This process manages activities related to planning, scheduling, and supporting manufacturing operations, such as work-in-process storage, handling, transportation, and time phasing of components, inventory at manufacturing sites, and maximum flexibility in the coordination of geographical and final assemblies postponement of physical distribution operations.

*e) Physical distribution*

This concerns the movement of a finished product or service to customers. In physical distribution, the customer is the final destination of a marketing channel, and the availability of the product or service is a vital part of each channel participant's marketing effort. It is also through the physical distribution process that the time and space of customer service become an integral part of marketing. Thus it links a marketing channel with its customers (i.e., it links manufacturers, wholesalers, and retailers).

*f) Outsourcing/partnerships*

This includes not just the outsourcing of the procurement of materials and components, but also the outsourcing of services that traditionally have been provided in house. The logic of this trend is that the company will increasingly focus on those activities in the value chain in which it has a distinctive advantage and outsource everything else. This movement has been particularly evident in logistics, where the provision of transport, warehousing, and inventory control is increasingly subcontracted to specialists or logistics partners. Also, managing and controlling this network of partners and suppliers requires a blend of central and local involvement: strategic decisions are taken centrally, while the monitoring and control of supplier performance and day-to-day liaison with logistics partners are best managed locally.

*g) Performance measurement*

Experts found a strong relationship from the largest arcs of supplier and customer integration to market share and profitability. Taking advantage of supplier capabilities and emphasizing a long-term supply chain perspective in customer relationships can both be correlated with a firm's performance. As logistics competency becomes a critical factor in creating and maintaining competitive advantage, measuring logistics performance becomes increasingly important, because the difference between profitable and unprofitable operations becomes narrower.

*h) Warehousing management*

To reduce a company's cost and expenses, warehousing management is carrying the valuable role against operations. In the case of perfect storage and office with all convenient facilities in company level, reducing manpower cost, dispatching authority with on time delivery, loading & unloading facilities with proper area, area for service station, stock management system etc.

*Ex.1. Answer the questions.*

1. What is the difference between logistics and supply chain management?
2. Who used the term “supply chain management” for the first time?
3. How would you define the supply chain management?
4. How would you characterize the supply chain management software?
5. What processes of supply chain management do you know?

*Ex. 2. Look at the use of **efficient** and **effective** in this sentence and choose the best definition (a or b) for each word.*

**Effective** (a) supply-chain management is the only way to make **efficient** (b) use of global sourcing strategies.

- a) when something works well, especially in terms of time and costs .
- b) when something works well and produces a good result.

Complete these sentences with either *efficient* or *effective*.

1. To remain competitive, companies need to have highly.....supply chains.
2. Companies that manage their core processes in a more cost.....way than their competitors will gain the advantage in the marketplace.
3. Suppliers and customers need to have.....communication systems in order to share information about production needs.
4. A well-run supply chain can make a company more....., leading to significantly reduced production costs.

*Ex. 3. Complete these sentences using the prepositions in the box.*

against away for for for for from in into to up
---

- 1 An efficient supply chain is a prize worth working.....
- 2 It needs a lot of resources to complete ..... the prize of an efficient supply chain.
- 3 The importance of the supply chain is moving .....the agenda.
- 4 Supply-chain managers are looking .....faster access to information.
- 5 In cases of production shortfalls, companies may need to bring..... alternative suppliers.
- 6 In the retail sector, supply-chain problems can lead .....empty shelves.
- 7 The cost of cancelled orders can run ..... billions of dollars.
- 8 Manufacturers are moving .....vertically integrated production.

9 The costs of running supply chains in the aerospace industry are small when set.....the cost of building an aircraft.

10 About 80 per cent of the cost of an aircraft is accounted.....by suppliers and partners.

*Ex. 4. Use the words and phrases in the box to complete the sentences.*

cost control ..... freight costs .....growth targets .....inventory ...replenishment deliveries  
road congestion ..... sales data ... vendors ..... working capital

1. To keep costs down, it is important for retailers to keep their.....levels as low as possible.

2. If retailers carry too much stock, they will use a lot of their.....

3. A more cost-effective way to operate is to schedule.....on a just-in-time basis.

4. If suppliers have live access to a customer's..... they can prepare deliveries specially for each store.

5. Suppliers are also known as.....

6. Delivering goods by truck now takes longer in many countries due to increased.....

7. With rising oil prices, .....are also going up.

8. A traditional aim of supply-chain managers is....., keeping costs down.

9. Big manufactures use their supply chain to meet sales.....

*Ex. 5. Write an essay: In what ways can your company producing consumer products use its supply chain to increase sales growth?*

## **Text 6.**

### **The Third-Party Logistics**

The third-party logistics provider (abbreviated 3PL, or sometimes TPL) is a firm that provides service to its customers of outsourced (or "third party") logistics services for part, or all of their supply chain management functions. Third party logistics providers typically specialize in integrated operation, warehousing and transportation services that can be scaled and customized to customers' needs based on market conditions, such as the demands and delivery service requirements for their products and materials. Often, these services go beyond logistics and include value-added services related to the production or procurement of goods, i.e., services that integrate parts of the supply chain. When this integration occurs, the provider is then called a third-party supply chain management provider (3PSCM) or supply chain management service provider (SCMSP). 3PL targets a particular function in supply management, such as warehousing, transportation, or raw material provision.

3PL is defined as a firm that provides multiple logistics services for use by customers. Preferably, these services are integrated, or bundled together, by the provider. Among the services 3PLs provide are transportation, warehousing, cross-docking, inventory management, packaging, and freight forwarding.

As logistics is the core competence of third party logistics providers. They possess better know how and a greater expertise as any producing or selling company could be able. This know-how together with the global networks of the often large company size enables a higher time and cost efficiency. Another point is, that the equipment and the IT systems of 3PL providers are constantly updated and adapted to new requirement of their customers, so that they are able to meet the requirements of their customer's suppliers. And that is more than essential to a company's survival. Producing or selling companies often do not have the time, resources or expertise to adapt their equipment and systems as quickly as necessary. So in conclusion a 3PL provider can meet the technical requirements in a faster and more cost efficient way than a company could do itself.

The fact that most or all operative functions are outsourced to a 3PL provider means there is no need for the client to own its own warehouse or transport facilities, lowering the amount of capital required for the client's business. This is particularly beneficial if a company has high variations in warehouse capacity utilization, because a bad capacity utilization ratio at equal fixed cost (for warehouse) will reduce a company's profitability.

Third party logistics provider can provide a much higher flexibility in geographic aspects and can offer a much larger variety of services than the clients could provide for themselves. In addition to that, the client gets flexibility in resources and workforce size and logistics fix costs turn into variable cost.

One particular disadvantage is the loss of control a client has by working with third party logistics. Eminently in outbound logistics when the 3PL provider completely assumes the communication and interacting with a firm's customer or supplier. By having a good and continuous communication with their clients, most 3PL's counter and try to charm away such doubts. Some 3PL's even paint the clients logos on their assets and vest their employees like the clients ones.

We can describe four categories of 3PL providers:

- *Standard 3PL Provider*: this is the most basic form of a 3PL provider. They would perform activities such as, pick and pack, warehousing, and distribution (business) – the most basic functions of logistics. For a majority of these firms, the 3PL function is not their main activity.

- *Service Developer*: this type of 3PL provider will offer their customers advanced value-added services such as: tracking and tracing, cross-docking, specific packaging, or providing a unique security system. A solid IT foundation and a focus on economies of scale and scope will enable this type of 3PL provider to perform these types of tasks.

- *The Customer Adapter*: this type of 3PL provider comes in at the request of the customer and essentially takes over complete control of the company's logistics activities. The 3PL provider improves the logistics dramatically, but does not develop

a new service. The customer base for this type of 3PL provider is typically quite small.

- *The Customer Developer*: this is the highest level that a 3PL provider can attain with respect to its processes and activities. This occurs when the 3PL provider integrates itself with the customer and takes over their entire logistics function. These providers will have few customers, but will perform extensive and detailed tasks for them.

Outsourcing may involve a subset of an operation's logistics, leaving some products or operating steps untouched because the in-house logistics is able to do better or cheaper than an external provider. Another important point is the customer orientation of the 3PL provider. The provider has to fit to the structures and the requirements of the company. This fit is more important than the pure cost savings, like a survey of 3PL providers shows clearly: The customer orientation in form of adaptability to changing customer needs, reliability and the flexibility of third party logistics provider were mentioned as much more important than pure cost savings.

Experts often suggest firms to choose 3PL providers with roots in the same area of logistics as the department that shall be outsourced. Furthermore it is worth to discuss if the company wants an asset-owning or a non-asset-owning 3PL Provider. 3PL provider without own assets are called lead logistics providers. Lead logistics provider have the advantage that they have specialized industry expertise combined with low overhead costs, but lower negotiation power and less resources than a third party provider has, based on a normally big company size, a good customer base and established network systems. But 3PL providers tend to shed clients efficiency consciously by preferring their own assets in order to maximize their own efficiency. In addition to that third party logistics provider often are bureaucratic and have long decision making cycles caused by the size of the company.

*Ex.1. Answer the questions*

1. How would you define the third-party logistics?
2. What services does the third-party logistics provide?
3. What are the main advantages and disadvantages of the third-party logistics?
4. What types of the third-party logistics do you know?
5. Why do expert often suggest to choose third-party logistics providers?

*Ex.2. Read the following text from a logistics company magazine about new trends in third-party logistics. Then label the paragraphs with the correct headings from the box..*

Today's role of major providers	Changing logistics requirements for manufacturers
3PL in the past	New challenges for 3PL
	Change in logistics concepts

1 \_\_\_\_\_

Until a few years ago, companies used to outsource only parts of their logistics operations to providers specializing in services such as distribution or warehousing. A single company sometimes had several third-party logistics providers (3PLs).



2 \_\_\_\_\_

The globalization of trade and increasing demand for services, however, has led to a drastic shift in logistics concepts and management with an impact on both producers and logistics providers.

3 \_\_\_\_\_

As far as manufacturers are concerned, logistics management has become a lot more complex. By now, many of them have learned that outsourcing single segments to different providers has not really made their logistics operations more efficient. That is why they are looking for providers who can provide a higher level of service and more comprehensive supply chain solutions.

4 \_\_\_\_\_

For 3PL.S all over the world, requirements keep getting more demanding with customers asking for a wider range of logistics solutions. Apart from that, logistics providers today are facing an increasingly tough and highly competitive market. In recent years, growing pressure on prices has led to a decrease in profit margins. In order to compensate for this, many third-party logistics providers now offer value-added services for their customers. Due to fierce competition in the 3PL market, however, experts predict that only the big international players will be able to work profitably in the future.

5 \_\_\_\_\_

The big global players, also called super-3PL.S, can provide their customers with comprehensive supply chain or end-to-end solutions. These services usually include forwarding, transportation, consolidation, customs brokerage, warehousing, and distribution, as well as a range of value-added

*Ex.3. Say which of these statements are true or false.*

1. In the past, companies used to outsource only segments of their logistics operations.
2. Manufacturers found out that outsourcing to 3PL providers is not efficient.
3. In the past few years many 3PL providers have increased their profit margins.
4. Customers today are demanding more complex logistics solutions.
5. Super-3PLs provide comprehensive solutions to logistics problems.

*Ex.4. Match the words (1-6) from the text with the correct definition (a-f).*

1. outsourcing
2. comprehensive
3. consolidation
4. requirements
5. demand
6. competition

- a. including a wide range of services

- b. details of what is expected and needed
- c. contracting functions out to third-party providers
- d. the need for particular goods or services
- e. companies trying to sell the same or similar products to customers
- f. the grouping of small shipments into one container

*Ex.5. Work in pairs. One of you is a top-manager of a manufacturer company. Another is a 3PL provider. Convince your partner to cooperate with you.*

### **Text 7.**

#### **Transportation**

Freight transport is the physical process of transporting commodities and merchandise goods and cargo. The term shipping originally referred to transport by sea, but is extended in American English to refer to transport by land or air (International English: "carriage") as well.

The word cargo refers in particular to goods or produce being conveyed – generally for commercial gain – by ship, boat, or aircraft, although the term is now often extended to cover all types of freight, including that carried by train, van, truck, or intermodal container. The term cargo is also used in case of goods in the cold-chain, because the perishable inventory is always in transit towards a final end-use, even when it is held in cold storage or other similar climate-controlled facility. Multimodal container units, designed as reusable carriers to facilitate unit load handling of the goods contained, are also referred to as cargo, specially by shipping lines and logistics operators. Similarly, aircraft ULD boxes are also documented as cargo, with associated packing list of the items contained within. When empty containers are shipped each unit is documented as a cargo and when goods are stored within, the contents are termed as containerised cargo

Land or "ground" shipping can be by train or by truck (International English: lorry). In air and sea shipments, ground transport is required to take the cargo from its place of origin to the airport or seaport and then to its destination because it is not always possible to establish a production facility near ports due to limited coastlines of countries. Ground transport is typically more affordable than air, but more expensive than sea especially in developing countries like India, where inland infrastructure is not efficient. Shipment of cargo by trucks, directly from the shipper's place to the destination, is known as a door to door shipment and more formally as multimodal transport. Trucks and trains make deliveries to sea and air ports where cargo is moved in bulk.

Much shipping is done aboard by actual ships. An individual nation's fleet and the people that crew it are referred to as its merchant navy or merchant marine. Merchant shipping is the lifeblood of the world economy, carrying 90% of international trade with commercial ships worldwide. On rivers and canals, barges are often used to carry bulk cargo. Seaport terminals handle a wide range of maritime cargo.

- Automobiles are handled at many ports and are usually carried on specialized roll-on/roll-off ships.

- Break bulk cargo is typically material stacked on pallets and lifted into and out of the hold of a vessel by cranes on the dock or aboard the ship itself. The volume of break bulk cargo has declined dramatically worldwide as containerization has grown. One way to secure break bulk and freight in intermodal containers is by using Dunnage Bags.

- Bulk cargo, such as salt, oil, tallow, and scrap metal, is usually defined as commodities that are neither on pallets nor in containers. Bulk cargoes are not handled as individual pieces, the way heavy-lift and project cargoes are. Alumina, grain, gypsum, logs, and wood chips, for instance, are bulk cargoes.

- Neo-bulk cargo comprises individual units that are counted as they are loaded and unloaded, in contrast to bulk cargo that is not counted, but that are not containerized.

- Containers are the largest and fastest growing cargo category at most ports worldwide. Containerized cargo includes everything from auto parts, machinery and manufacturing components to shoes and toys to frozen meat and seafood.

- Project cargo and the heavy lift cargo include items like manufacturing equipment, air conditioners, factory components, generators, wind turbines, military equipment, and almost any other oversized or overweight cargo which is too big or too heavy to fit into a container.

Cargo was transported by air in specialized cargo aircraft and in the luggage compartments of passenger aircraft. Air freight is typically the fastest mode for long distance freight transport, but also the most expensive. Air cargo, commonly known as *air freight*, is collected by firms from shippers and delivered to customers. Aircraft were first used for carrying mail as cargo in 1911. Eventually manufacturers started designing aircraft for other types of freight as well. There are many commercial aircraft suitable for carrying cargo such as the Boeing 747 and the bigger An-124, which was purposely built for easy conversion into a cargo aircraft. Such large aircraft employ quick-loading containers known as unit load devices (ULDs), much like containerized cargo ships. The ULDs are located in the front section of the aircraft.

Intermodal freight transport refers to shipments that involve more than one mode. More specifically it usually refers to the use of intermodal shipping containers that are easily transferred between ship, rail and truck.

Governments are very concerned with the shipment of cargo, as it may bring security risks to a country. Therefore, many governments have enacted rules and regulations, administered by a customs agency, to the handling of cargo to minimize risks of terrorism and other crime. Governments are particularly concerned with cargo entering through a country's borders.

There are many different ways and materials available to stabilize and secure cargo in various modes of transport. Conventional load securing methods and materials such as steel strapping and plastic/wood blocking & bracing have been used for decades and are still widely used. Present load securing methods offer several other

options including polyester strapping and lashing, synthetic webbings and dunnage bags, also known as air bags or inflatable bags

Common trading terms used in shipping goods internationally include 4 different groups: an E Term (Departure), the F Terms (Free, Main Carriage Unpaid), the C Terms (Main Carriage Paid), and the D Terms (Delivered/Arrival). Each group of terms adds more responsibilities to the seller and gives fewer to the buyer.

The E term is EXW or Ex Works. This means that the buyer collects the goods at the seller's own premises - place of business - and arranges insurance against loss or damage to the goods in transit.

In the second group, the F terms, the seller delivers the goods to a carrier appointed by the buyer and located in the seller's country. The buyer arranges insurance.

FCA or Free Carrier means that the goods are delivered to a named place where the carrier can load them onto a truck, train or aeroplane.

FAS - Free Alongside Ship means that seller delivers the goods to the quay next to the ship in the port.

FOB - Free On Board means that the seller pays for loading the goods onto the ship.

### **The C and D terms**

In the third group, the C terms, the seller arranges and pays for the carriage or transportation of the goods, but not for the payment of customs duties and taxes. Transportation of goods is also known as freight.

In CFR - Cost and Freight (used for ocean freight) and CPT - Carriage Paid To ... (used for air freight and land freight), the buyer is responsible for insurance.

In the terms CIF - Cost, Insurance and Freight (used for ocean freight) and CIP - Carriage and Insurance Paid To ... (used for air freight and land freight), the seller arranges and pays for insurance.

In the fourth group, the D Terms, the seller pays all the costs involved in transporting the goods to the country of destination, including insurance.

In DAF - Delivered At Frontier, the importer is responsible for preparing the documentation and getting the goods through customs.

If the goods are delivered by ship to a port, the two parties can choose who pays for unloading the goods onto the quay. The two possibilities are:

DES - Delivered Ex Ship - the buyer pays for unloading the goods from the ship

DEQ - Delivered Ex Quay - the seller pays for unloading the goods from the ship to the quay, and for the payment of customs duties and taxes.

If the goods go through customs and are delivered to the buyer, there are two possibilities:

DDU - Delivered Duty Unpaid - the buyer pays any import taxes

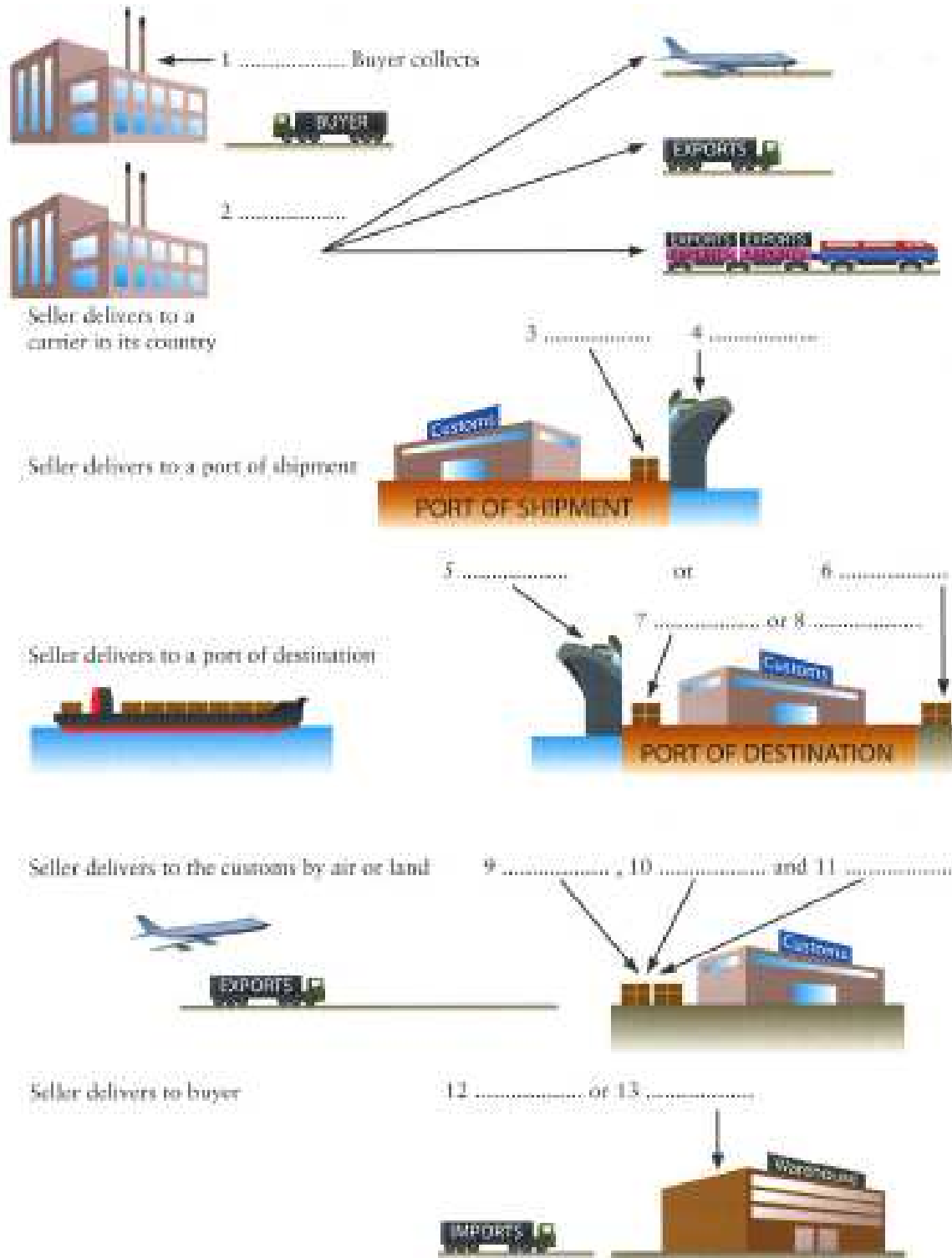
DDP - Delivered Duty Paid - the seller pays any import taxes.

### *Ex.1. Answer the questions*

1. What does the term "freight" include?
2. What's the best way of land shipping for CIS market?

3. What goods are shipped by air?
4. What trading term used in shipping do you know?
5. What does the intermodal freight transport refers to?
6. How do imported goods normally arrive in Belarus?

*Ex.2. Label the diagram using the abbreviations for Incoterms. Look at A, B and C opposite to help you*



Ex.3. Match the pictures (a-f) with the names (1-6).



a \_\_\_\_\_



b \_\_\_\_\_



c \_\_\_\_\_



d \_\_\_\_\_



e \_\_\_\_\_



f \_\_\_\_\_

1. swap-body
2. container ship
3. grappler lift
4. road-railer trailer
5. river barge
6. LGV (large goods vehicle)

Ex.4. Match the different types of freight traffic (1-6) with the definitions (a-f).

<ol style="list-style-type: none"> <li>1. multimodal</li> <li>2. piggyback</li> <li>3. intermodal</li> <li>4. unaccompanied</li> <li>5. block train</li> <li>6. single-wagon</li> </ol>	<ol style="list-style-type: none"> <li>a. The driver does not stay with his road vehicle during transport by rail or ferry.</li> <li>b. Goods are transported in the same loading unit or vehicle using different modes of transport. The handling of the freight itself is not necessary when changing modes,</li> <li>c. A single shipper uses a whole train which is run directly from the loading point to the destination. No assembling and disassembling is required,</li> <li>d. Carriage of goods by at least two different modes of transport, e.g. shipping by motor lorry and aircraft.</li> <li>e. Train is formed out of individual wagons or sets of wagons which have different origins and different destinations.</li> <li>f. Combines road and rail transport: whole motor lorries, trailers or swap-bodies are carried by rail.</li> </ol>
---	--

Ex.5 Work in pairs. Compare different transport modes using some of the adjectives in the box.

Example: I think shipping goods by rail is faster than sea transport.

<i>adjectives</i>	<i>transport modes</i>
slow / fast	rail
expensive / cheap	air
safe	road
suitable	sea
reliable	river
environmentally friendly	pipeline

## ***Text 8.***

### **Logistics Documentation (Part I)**

There are many documents used in logistics. They are called: invoices, packing lists/slips/sheets (manifests), content lists, pick tickets, arrival acknowledgement forms/reports of many types (e.g. MSDS, damaged goods, returned goods, detailed/summary, etc.), import/export, delivery, bill of lading (BOL), etc. These documents are usually the contracts between the consignee and the consignor, so they are very important for both parties and any intermediary, like a third party logistics company (3PL) and governments. Document handling within logistics, supply chain management and distribution centers is usually performed manual labor or semi-automatically using bar code scanners, software and tabletop laser printers. There are some manufacturers of high speed document automation systems that will automatically compare the laser printed document to the order and either insert or automatically apply an enclosed wallet/pouch to the shipping container (usually a flexible poly-bag or corrugated fiberboard/rigid container). Protection of Privacy and Identity Theft are major concerns, especially with the increase of e-Commerce, Internet/Online shopping and Shopping channel (other, past references are catalogue and mail order shopping) making it more important than ever to guarantee the correct document is married or associated to the correct order or shipment every time. Software that produce documents are; ERP, WMS, TMS, legacy middleware and most accounting packages.

An invoice, bill or tab is a commercial document issued by a seller to a buyer, relating to a sale transaction and indicating the products, quantities, and agreed prices for products or services the seller had provided the buyer.

Payment terms are usually stated on the invoice. These may specify that the buyer has a maximum number of days in which to pay, and is sometimes offered a discount if paid before the due date. The buyer could have already paid for the products or services listed on the invoice.

From the point of view of a seller, an invoice is a *sales invoice*. From the point of view of a buyer, an invoice is a *purchase invoice*. The document indicates the buyer and seller, but the term *invoice* indicates money is owed *or* owing. A typical invoice contains

- The word *invoice*
- A unique reference number (in case of correspondence about the invoice)
- Date of the invoice.
- Credit terms.
- Tax payments if relevant (ExWork or VAT)
- Name and contact details of the seller
- Tax or company registration details of seller.
- Name and contact details of the buyer
- Date that the goods or service was sent or delivered
- Purchase order number (or similar tracking numbers requested by the buyer to be mentioned on the invoice)
- Description of the product(s)

- Unit price(s) of the product(s) (if relevant)
- Total amount charged (optionally with breakdown of taxes, if relevant)
- Payment terms (including method of payment, date of payment, and details about charges for late payment)

In countries where wire transfer is the preferred method of settling debts, the printed bill will contain the bank account number of the debtor and usually a reference code to be passed along the transaction identifying the payer. The European Union requires a VAT (value added tax) identification number. Recommendations about invoices used in international trade are also provided by the UNECE Committee on Trade, which involves more detailed description of the logistics aspect of merchandise and therefore may be convenient for international logistics and customs procedures.

There are different types of invoices:

- **Pro forma invoice.** In foreign trade, a *pro forma* invoice is a document that states a commitment from the seller to provide specified goods to the buyer at specific prices. It is often used to declare value for customs. It is not an actual invoice, and thus the seller does not record a *pro forma* invoice as an account receivable and the buyer does not record a *pro forma* invoice as an account payable. A *pro forma* invoice is not issued by the seller until the seller and buyer have agreed to the terms of the order. In a few cases, a *pro forma* invoice is issued to request advance payments from the buyer, either to allow production to start or for security of the goods produced.

- **Credit memo.** If the buyer returns the goods, the seller usually issues a credit memo for the same or lower amount than the invoice, and then refunds the money to the buyer, or the buyer can apply that credit memo to another invoice.

- **Commercial invoice** – a customs declaration form used in international trade that describes the parties involved in the shipping transaction, the goods being transported, and the value of the goods. It is the primary document used by customs, and must meet specific customs requirements, such as the Harmonized System number and the country of manufacture. It is used to calculate tariffs.

- **Debit memo.** When a company fails to pay or short-pays an invoice, it is common practice to issue a *debit memo* for the balance and any late fees owed. In function, debit memos are identical to invoices.

- **Self-billing invoice.** A *self billing invoice* is when the buyer issues the invoice to himself (e.g. according to the consumption levels he is taking out of a vendor-managed inventory stock). The buyer (i.e. the issuer) should treat the invoice as an account payable, and the seller should treat it as an account receivable.

- **Evaluated receipt settlement (ERS).** ERS is a process of paying for goods and services from a packing slip rather than from a separate invoice document. The payee uses data in the packing slip to apply the payments.

- **Timesheet** - Invoices for hourly services issued by businesses such as lawyers and consultants often pull data from a timesheet. A timesheet invoice may also be generated by Operated equipment rental companies where the invoice will be a combination of timesheet based charges and equipment rental charges.



● **Statement.** A periodic customer statement includes opening balance, invoices, payments, credit memos, debit memos, and ending balance for the customer's account during a specified period. A monthly statement can be used as a summary invoice to request a single payment for accrued monthly charges.

● **Progress billing** used to obtain partial payment on extended contracts, particularly in the construction industry (see Schedule of values)

● **Collective Invoicing** is also known as monthly invoicing in Japan. Japanese businesses tend to have many orders with small amounts because of the outsourcing system (Keiretsu), or of demands for less inventory control (Kanban). To save the administration work, invoicing is normally processed on monthly basis.

● **Continuation or Recurring Invoicing** is standard within the equipment rental industry, including tool rental. A recurring invoice is one generated on a cyclical basis during the lifetime of a rental contract. For example if you rent an excavator from 1 January to 15 April, on a calendar monthly arrears billing cycle, you would expect to receive an invoice at the end of January, another at the end of February, another at the end of March and a final Off-rent invoice would be generated at the point when the asset is returned. The same principle would be adopted if you were invoiced in advance, or if you were invoiced on a specific day of the month.

● **Electronic Invoicing** is not necessarily the same as EDI invoicing. Electronic invoicing in its widest sense embraces EDI as well as XML invoice messages as well as other format such as pdf. Historically, other formats such as pdf were not included in the wider definition of an electronic invoice because they were not machine readable and the process benefits of an electronic message could not be achieved. However, as data extraction techniques have evolved and as environmental concerns have begun to dominate the business case for the implementation of electronic invoicing, other formats are now incorporated into the wider definition.

Organizations purchasing goods and services usually have a process in place for approving payment of invoices based on an employee's confirmation that the goods or services have been received. Typically, when paying an invoice, a remittance advice will be sent to the supplier to inform them their invoice has been paid.

Invoices are different from receipts. Both invoices and receipts are ways of tracking purchases of goods and services. In general the content of the invoices can be similar to that of receipts including tracking the amount of the sale, calculating sales tax owed and calculating any discounts applied to the purchase. Invoices differ from receipts in that invoices serve to notify customers of payments owed, whereas receipts serve as proof of completed payment.

*Ex.1. Match the beginnings of the sentences (1-6) with the endings (a-f).*

1. I would need some information	a. would recommend rail transport.
2. Could you let me know	b. by courier if you prefer.
3. In that case I suggest that you	c. regarding loading times.
4. For a consignment this size I	d. what the transit times are?
5. Of course it would also be	e. possible to ship by express service instead.
6. We can also arrange transport	f. use the cheaper sea freight option.

*Ex.2. Put the words in the right order.*

1. a shipment / send / us / a quotation / please / for / to Minsk
2. state / delivery date / please / in your quotation / your earliest
3. let us / could / the following / please / have a quotation / including / details / you ?
4. a part truck load / shipping rates / what / your / for / to Birmingham / are ?
5. on sailing times / your quotation / detailed information / should / and insurance rates / also include
6. the following consignment / please / for / of / quote / the transport

*Ex. 3. Complete the sentences with words from the box.*

so   because   although   due   as a result   despite   because   in spite of
---

1. Our customer wants to ship valuable freight, \_\_\_\_\_ we need to think about insurance.
2. A part of the shipment seems to be damaged \_\_\_\_\_ of rough handling.
3. \_\_\_\_\_ the customer needed them urgently, the goods couldn't be delivered at the weekend.
4. The flight was cancelled \_\_\_\_\_ to bad weather.
5. The driver had the wrong address. \_\_\_\_\_, it took him three hours to deliver the pallets.
6. The consignment arrived on time \_\_\_\_\_ all the customs formalities at the border.
7. We are unable to ship today \_\_\_\_\_ we've had problems with our dispatch.
8. \_\_\_\_\_ being well secured, the load was damaged on arrival.

*Ex.4. Choose the correct words to complete these sentences.*

1. The documents stated the wrong quantities. As a (reason/result/cause), the shipment was not accepted at the warehouse.
2. The delay was (found/noticed/caused) by an accident on the motorway.
3. When I spoke to the logistics manager, it (noticed/saw/turned) out that they had used different packing material.
4. Unfortunately, we are unable to deliver the consignment (due to/because/so) technical problems in our warehouse.
5. (Although/In spite of/But) the delay, the delivery will still arrive on time.
6. What is the (cause/reason/result) for this delay?

*Ex.5. Complete the sentences with by or until.*

1. I'll make sure that the documents arrive \_\_\_\_\_ the end of the week.
2. We have to arrange shipment \_\_\_\_\_ August 4<sup>th</sup>.
3. I'm afraid there will be delays \_\_\_\_\_ the beginning of July.
4. They said we would receive the consignment \_\_\_\_\_ Monday.
5. Call me if there are any problems. I'll be in my office \_\_\_\_\_ 6.30 today.
6. We require the goods \_\_\_\_\_ March 15<sup>th</sup>.

## ***Text 9.***

### **Logistics Documentation (Part II)**

#### *Documentary credits*

A company which sells goods or services to other countries is known as an exporter. A company which buys products from other countries is called an importer. Payment for imported products is usually by documentary credit, also called a letter of credit. This is a written promise by a bank to pay a certain amount to the seller, within a fixed period, when the bank receives instructions from the buyer.

Documentary credits have a standard form. They generally contain:

- a. a short description of the goods
- b. a list of shipping documents required to obtain payment (see C below)
- c. a final shipping date
- d. a final date (or expiration date) for presenting the documents to the bank.

Documentary credits are usually irrevocable, meaning that they cannot be changed unless all the parties involved agree. Irrevocable credits guarantee that the bank which establishes the letter of credit will pay the seller if the documents are presented within the agreed time.

#### *Bills of exchange*

Another method of payment is a bill of exchange or draft. This is a payment demand, written or drawn up by an exporter, instructing an importer to pay a specific sum of money at a future date. When the bill matures, the importer pays the money to its bank, which transfers the money to the exporter's bank. This bank then pays the money to the exporter after deducting its charges.

A bank may agree to endorse or accept a bill of exchange before it matures. To endorse a bill is to guarantee to pay it if the buyer of goods does not. If a bill is endorsed by a well-known bank, the exporter can sell it at a discount in the financial markets. The discount represents the interest the buyer of the bill could have earned between the date of purchase and the bill's maturity date. When the bill matures, the buyer receives the full amount. This way the exporter gets most of the money immediately, and doesn't have to wait for the buyer to pay the bill.

#### *Export documents*

Exporters have to prepare a number of documents to go with the shipment or transportation of goods.

- The commercial invoice contains details of the goods: quantity, weight, number of packages, price, terms of delivery, terms of payment, and information about the transportation.
- The bill of lading is a document signed by the carrier or transporter (e.g. the ship's master) confirming that the goods have been received for shipment; it contains a brief description of the goods and details of where they are going.
- The insurance certificate also describes the goods and contains details of how to claim if they are lost or damaged in transit - while being transported.
- The certificate of origin states where the goods come from.

- Quality and weight certificates, issued by private inspection and testing companies, may be necessary, confirming that these are the correct goods in the right quantity.
- An export license giving the right to sell particular goods abroad is necessary in some cases.

*Ex.1. Are the following statements true or false?*

1. With a letter of credit, the buyer tells the bank when to pay the seller.
2. Letters of credit are only valid for a certain length of time.
3. An exporter usually has the right to change a letter of credit.
4. The bill of lading confirms that the goods have been delivered to the buyer.
5. With a bill of exchange, the seller can get most of the money before the buyer pays.
6. Bills of exchange are sold at less than 100%, but redeemed at 100% at maturity.

*Ex.2. Put the sequence of events in the correct order.*

- a. A bank accepts or endorses the bill of exchange.
- b. The accepting bank pays the full value of the bill of exchange to whoever bought it.
- c. The exporter sells the bill of exchange at a discount on the money market.
- d. The importer receives the goods and pays its bank.
- e. The importer's bank transfers the money to the accepting bank.
- f. The seller or exporter writes a bill of exchange and sends it to the buyer or importer (and ships the goods).

*Ex.3. Fill gaps in sentences*

1. Exporters can get paid sooner if a bill of exchange is..... by a bank.
2. The bill of lading and the insurance certificate both..... the goods.
3. Exporters..... goods to foreign countries.
4. The transporter.....a document confirming that it has.....the goods.
5. In order to be paid, the exporter has to..... the shipping documents to a specific bank.

*Ex.4. Complete this list of documents used in foreign trade with words from the box.*

approved authority required commercial indicating draft receipt conditions  
 carriage hazardous

### **Commercial invoice**

A document that contains specific information regarding the goods shipped and the \_\_\_\_\_ agreed between buyer and seller.

**Certificate of origin**

Document used in foreign trade which states where the goods were produced. It is often \_\_\_\_\_ by customs authorities.

**Packing list**

A document which specifies the contents of any form of packaging, e.g. boxes, containers, cartons, without \_\_\_\_\_ the value of the goods shipped.

**Air waybill**

A contract between airline and shipper. It is a shipping document which states the terms and conditions of \_\_\_\_\_ and is also a receipt for the consignment.

**Consular invoice**

A special kind of invoice sometimes required by the importing country. It needs to be \_\_\_\_\_ by an embassy.

**Pro forma invoice**

A \_\_\_\_\_ invoice which the seller prepares before the actual shipment takes place.

**Export license**

A document which is granted by a government \_\_\_\_\_ and states that specified goods can be exported.

**Customs invoice**

A specific document required by customs in some countries e.g. US when importing goods. It includes more details than a \_\_\_\_\_ invoice.

**Dangerous goods declaration**

Certificate prepared by the shipper/consignor which states that \_\_\_\_\_ goods are handled according to international shipping regulations.

**Bill of lading**

A contract between carrier and shipper which specifies the goods to be shipped and the delivery terms. It is also a \_\_\_\_\_ of shipment and accompanies the goods until they reach their destination.

*Ex.5. Match the payment methods (1-6) with the definitions (a-f).*

1. advance payment
2. cash on delivery
3. open account
4. documents against payment
5. documentary credit
6. bank guarantee

- a. Customer pays immediately on receiving the goods. This service is usually provided by the post office.
- b. Used to cover financial risk in international transactions e.g. if a buyer does not pay.
- c. The exporter supplies the goods and the importer/customer pays for them at an agreed date in the future.
- d. Involves the buyer's and the seller's bank. It is a promise made by the opening bank that payment will be made on receiving documents that comply with the terms agreed.
- e. Also called cash against documents (CAD). It means that the exporter has full control over the documents until payment has been made by the importer.
- f. Customer/importer has to pay for the goods before they are shipped.

***Text 10.***

**Reverse Logistics**

Text Reverse logistics is the process of moving goods from their typical final destination for the purpose of capturing value, or proper disposal. Remanufacturing and refurbishing activities also may be included in the definition of reverse logistics. The reverse logistics process includes the management and the sale of surplus as well as returned equipment and machines from the hardware leasing business. Normally, logistics deal with events that bring the product towards the customer. In the case of reverse logistics, the resource goes at least one step back in the supply chain. For instance, goods move from the customer to the distributor or to the manufacturer.

When a manufacturer's product normally moves through the supply chain network, it is to reach the distributor or customer. Any process or management after the sale of the product involves reverse logistics. If the product is defective, the customer would return the product. The manufacturing firm would then have to organize shipping of the defective product, testing the product, dismantling, repairing, recycling or disposing the product. The product would travel in reverse through the supply chain network in order to retain any use from the defective product. The logistics for such matters is reverse logistics.

In today's marketplace, many retailers treat merchandise returns as individual, disjointed transactions. The challenge for retailers and vendors is to process returns at a proficiency level that allows quick, efficient and cost-effective collection and return of merchandise. Customer requirements facilitate demand for a high standard of service that includes accuracy and timeliness. It's the logistic company's responsibility to shorten the link from return origination to the time of resell. By following returns management best practices, retailers can achieve a returns process that addresses both the operational and customer retention issues associated with merchandise returns.[http://en.wikipedia.org/wiki/Reverse\\_logistics](http://en.wikipedia.org/wiki/Reverse_logistics) - cite\_note-5 Further, because of the connection between reverse logistics and customer retention, it has become a key

component within Service Lifecycle Management (SLM), a business strategy aimed at retaining customers by bundling even more coordination of a company's services data together to achieve greater efficiency in its operations.

Reverse logistics is more than just returns management, it is activities related to returns avoidance, gatekeeping, disposal and all other after-market supply chain issues. Returns management – increasingly being recognized as affecting competitive positioning – provides an important link between marketing and logistics. The broad nature of its cross-functional impact suggests that firms would benefit by improving internal integration efforts. In particular, a firm's ability to react to and plan for the influence of external factors on the returns management process is improved by such internal integration. In a firm's planning for returns, a primary factor is the remaining value of the material returning and how to recover that value. Returned goods, or elements of the product, could even be returned to suppliers and supply chain partners for them to re-manufacture.

In certain industries, goods are distributed to downstream members in the supply chain with the understanding that the goods may be returned for credit if they are not sold e.g., newspapers and magazines. This acts as an incentive for downstream members to carry more stock, because the risk of obsolescence is borne by the upstream supply chain members. However, there is also a distinct risk attached to this logistics concept. The downstream member in the supply chain might exploit the situation by ordering more stock than is required and returning large volumes. In this way, the downstream partner is able to offer high level of service without carrying the risks associated with large inventories. The supplier effectively finances the inventory for the downstream member. It is therefore important to analyze customers' accounts for hidden costs.

In case of e-commerce business, many websites offer the flexibility of cash on delivery (COD) to their customers. Sometimes customers refuse the product at the time of delivery, as there is no commitment to take the product. Then the logistics service provider follows the process of reverse logistics on the refused cargo. It is also known as Return to Origin (RTO). In this process, the e-commerce company adds the refused cargo to its inventory stock again, after proper quality checks as per the company's rules.

In case of the Demonstration of Products to the client as part of Pre-Sales process, The Demonstration equipment is sent to the Customer and has to be returned to maintain Revolving Inventory.

*Ex.1. Answer the questions*

1. How would you define reverse logistics? 2. What does the process of reverse logistics include? 3. How can you explain the expression “one step back in the supply chain”? 4. How would you define the term “Service Lifecycle Management”? 5. What are downstream members in supply chain? 6. How does reverse logistics operate in e-commerce? 7. How would you define the term “Return to Origin”? 8. Have you ever met with reverse logistics in your own life?

*Ex.2 Find in the right column the English equivalents to the following words.*

- |                       |                 |
|-----------------------|-----------------|
| a. пункт назначения   | 1. destination  |
| b. восстановление     | 2. refurbishing |
| c. излишки            | 3. surplus      |
| d. демонтаж           | 4. dismantling  |
| e. утилизация         | 5. recycling    |
| f. розничные продавцы | 6. retailers    |
| g. поставщики         | 7. vendors      |
| h. износ              | 8. obsolescence |

*Ex.3. Match the words (1-8) with their definitions (a-h) below.*

1. transshipment	a. direct flow of goods from receipt at warehouse to shipping, bypassing storage
2. break-bulk	b. collecting and handling of used or damaged goods or of reusable transit equipment
3. cross-docking	c. loading goods from one means of carriage onto another
4. order picking	d. selecting and assembling items from stock for shipments
5. reverse logistics	e. packing goods in small, separable units
6. tracking and tracing	f. picking up goods at a named place
7. warehousing	g. receiving and storing goods
8. collection	h. locating items in transit

*Ex.4. Write an essay: “Reverse logistics is fundamental part of e-commerce business”*

**Text 11.**

**My Future Profession**

There are many interesting and useful professions and it is really not an easy task to choose the right one.

I began to think about my future profession at the age of 16. My favorite subjects at school were mathematics and English. My teachers were well-educated people with broad outlook and deep knowledge of the subjects. They encouraged me in my desire to become a logistician. Now I know well what I'm going to do after leaving school. I didn't make a blind choice. It was not a sudden flash either. I opted for a career in logistics. I came to this decision little by little. It was my father who aroused my interest in that field. You see, he is a businessman and I often saw him work at home and discuss business matters with his colleagues. Later I got interested in the matter.

Logistics is the management of the flow of goods between the point of origin and the point of consumption in order to meet some requirements, of customers or corporations. A logistician is a professional logistics practitioner. The main functions of a qualified logistician include inventory management, purchasing, transportation, warehousing, consultation, and the organizing and planning of these activities. Logis-



ticians combine a professional knowledge of each of these functions to coordinate resources in an organization. Professional logisticians are often certified by professional associations. One can either work in a pure logistics company, such as a shipping line, airport, or freight forwarder, or within the logistics department of a company. Logistics is a broad field, encompassing procurement, production, distribution, and disposal activities. Hence, career perspectives are broad as well. A new trend in the industry are the 4PL, or fourth-party logistics, firms, consulting companies offering logistics services.

To become a good specialist in logistics one must know many sciences, such as business economics, geography, finance and credits, statistics, history of economic theory and philosophy, mathematics, as well as economic management and, of course, international trade business.

It is very important for a specialist in business matters to be a skilful user of computers and to speak at least one foreign language. It should better be English as it is the most popular language of international business communication.

So passed my entrance exams successfully and now I am the first-year student of Brest State Technical University. I'll try to study to the best of my abilities to achieve my life's ambition and to justify the hopes of my parents. I also hope that I'll never regret my choice and get a well-paid and interesting job afterwards.

*Ex.1. Complete the job advertisement for a corporate procurement manager with words from the box.*

fulfillment	negotiation	3PL providers	procurement	command	vendors	supply chain
relationship						

We are looking for a proactive and dynamic professional to take care of our strategic procurement and supplier \_\_\_\_\_ management.

Reporting to the Director of Corporate Procurement, the successful applicant will be responsible for managing both internal and external customers and for working with the appointed \_\_\_\_\_. While liaising with the \_\_\_\_\_ team, \_\_\_\_\_, and related stakeholders, you will also be involved in providing business support to optimize finance-logistics processes, order \_\_\_\_\_, and logistics costs.

Other responsibilities include providing initiatives to help maximize company business profitability and efficiency.

The ideal candidate should have a degree in \_\_\_\_\_ management or logistics management with a deep understanding and knowledge of the China logistics market. You should have at least 5 years' experience in a multinational company and you should possess outstanding \_\_\_\_\_ skills. Based in Macau, excellent \_\_\_\_\_ of English and Cantonese is a must with Mandarin an advantage.

If you are interested in this role, please send your CV in Word format to .....

*Ex.2. Read the job advertisement again and answer the questions.*

1. What area will the new corporate procurement manager head? 2. What are the procurement manager's main responsibilities? List two or three. 3. Who will he/she

collaborate with closely in his/her job? 4. What qualifications are expected? 5. What kind of experience is required?

*Can you think of other areas which are important in procurement? Discuss with a partner.*

*Ex. 3. Complete the sentences with words from the box.*

experience background hours knowledge company job
---

1. You need to have a through \_\_\_\_\_ of reverse logistics to apply for this position. 2. He is not with his mundane \_\_\_\_\_. 3. Alibaba is a widely recognized and prosperous \_\_\_\_\_. 4. Most of our employees work flexible \_\_\_\_\_. 5. The pay depends on previous \_\_\_\_\_. 6. Our course is designed to provide the analytical \_\_\_\_\_ necessary for students wishing to study business now.

*Ex.4. Complete the sentences with suitable prepositions.*

1. The pay depends \_\_\_\_\_ previous experience. 2. A suitable candidate will have \_\_\_\_\_ least 2 years logistics experience. 3. Those selected \_\_\_\_\_ an interview will be contacted. 4. We are currently looking for an Office Administrator \_\_\_\_\_ to join our team. 5. The candidate is expected \_\_\_\_\_ to have through knowledge of budgeting. 6. The candidate must be able \_\_\_\_\_ to work \_\_\_\_\_ different projects simultaneously.

*Ex.5. Write an essay "I want to work in logistics business."*

## **Part II.**

### **Supplementary Reading**

*Development of Logistics.* Logistics activity is literally thousands of years old, dating back to the earliest forms of organized trade. As an area of study however, it first began to gain attention in the early 1900s in the distribution of farm products, as a way to support the organization's business strategy, and as a way of providing time and place utility.

*Military Logistics.* Following the clear importance of the contribution of logistics toward the Allied victory in World War II, logistics began to receive increased recognition and emphasis. Just as in the Persian Gulf War in 1990-1991, the ability to efficiently and effectively distribute and store supplies and personnel were key factors in the success of the U.S. Armed Forces.

The first dedicated logistics texts began to appear in the early 1960s, which also is the time that Peter Drucker, a noted business expert, author, and consultant, stated that logistics was one of the last real frontiers of opportunity for organizations wishing to improve their corporate efficiency. These factors combined to increase the interest in logistics.

*Deregulation.* To further fuel the focus on logistics, deregulation of the transportation industry in the late 1970s and early 1980s gave organizations many more options and increased the competition within and between transportation modes. As a result, carriers became more creative, flexible, customer-oriented, and competitive in order to succeed. Shippers are now faced with many more transportation options. They can focus on negotiation of rates, terms, and services, with their overall attention directed toward getting the best transportation buy.

*Competitive Pressures.* With rising interest rates and increasing energy costs during the 1970s, logistics received more attention as a major cost driver. In addition, logistics costs became a more critical issue for many organizations because of the globalization of industry. This has affected logistics in two primary ways.

First, the growth of world class competitors from other nations has caused organizations to look for new ways to differentiate their organizations and product offerings. Logistics is a logical place to look because domestic organizations should be able to provide much more reliable, responsive service to nearby markets than overseas competitors.

Second, as organizations increasingly buy and sell offshore, the supply chain between the organization and those it does business with becomes longer, more costly, and more complex. Excellent logistics management is needed to fully leverage global opportunities.

Another factor strongly contributing to the increased emphasis and importance of logistics is a continued and growing emphasis on cost control. A survey of chief executive officers of Fortune 500 manufacturing firms and Fortune 500 service firms indicated that they believed that the most important way to improve company profitability was through cost cutting and cost control. Thus, despite all the talk and emphasis on other issues, such as quality and customer service which CEOs rated as second and third in importance, cost cutting is still seen as the most important factor.

*Information Technology.* At about this same time, information technology really began to explode. This gave organizations the ability to better monitor transaction intensive activities such as the ordering, movement, and storage of goods and materials. Combined with the availability of computerized quantitative models, this information increased the ability to manage flows and to optimize inventory levels and movements. Systems such as materials requirements planning (MRP, MRP II), distribution resource planning (DRP, DRP II), and just-in-time (JIT) allow organizations to link many materials management activities, from order processing to inventory management, ordering from the supplier, forecasting and production scheduling.

Other factors contributing to the growing interest in logistics include advances in information systems technology, an increased emphasis on customer service, growing recognition of the systems approach and total cost concept, the profit leverage from logistics, and the realization that logistics can be used as a strategic weapon in competing in the marketplace.

*Channel power.* The shifting of channel power from manufacturers to retailers, wholesalers, and distributors has also had a profound impact on logistics. When competition rises in major consumer goods industries, there is a shakeout of many suppli-

ers and manufacturers, so that a few leading competitors remain. Those remaining are intensely competitive and offer very high-quality products. In many cases, the consumer sees all of the leading brands as substitutes for each other. Lower brand-name loyalty decreases a manufacturer's power. This increases the retailer's power because sales are determined by what is in stock, not by what particular brands are offered.

*Profit Leverage.* The profit leverage effect of logistics illustrates that \$1.00 saved in logistics costs has a much greater impact on the organization's profitability than a \$1.00 increase in sales. In most organizations, sales revenue increases are more difficult to achieve than logistics cost reductions. This is particularly true in mature markets, where price cuts are often met by the competition, and revenue in the whole industry thus declines.

There are many costs associated with a sale, such as the cost of goods sold and logistics-related costs. Thus, a \$1.00 increase in sales does not result in a \$1.00 increase in profit. If, for example, an organization's net profit margin (sales revenue less costs) is 2 percent, the firm only receives a before tax profit of \$0.02, from each sales dollar. Yet, any dollar saved in logistics does not require sales or other costs to generate the savings. Therefore, a dollar saved in logistics costs is a dollar increase in profit! As a result, logistics cost savings have much more leverage, dollar for dollar, than an increase in sales. Thus, the term, the "profit leverage effect of logistics," is relevant.

*Systems Approach/Integration.* The systems approach is a critical concept in logistics. Logistics is, in itself, a system; it is a network of related activities with the purpose of managing the orderly flow of material and personnel within the logistics channel. It shows amplified example of the network of relationships that logistics has to manage in a channel of distribution.

*Systems Approach/Integration.* The systems approach is a critical concept in logistics. Logistics is, in itself, a system; it is a network of related activities with the purpose of managing the orderly flow of material and personnel within the logistics channel. It shows a simplified example of the network of relationships that logistics has to manage in a channel of distribution.

The systems approach simply states that all functions or activities need to be understood in terms of how they affect, and are affected by, other elements and activities with which they interact. The idea is that if one looks at actions in isolation, he or she will not understand the big picture or how such actions affect, or are affected by, other activities. In essence, the sum, or outcome of a series of activities, is greater than its individual parts.

While it might be desirable to have high inventory levels in order to improve customer order fulfillment, high inventory levels increase storage costs as well as the risk of obsolescence. Those unfavorable factors must be "traded off" with the favorable aspects of a decision before arriving at a decision on inventory levels. Without considering the impact of decisions on the larger system, such as the firm or the distribution channel, sub-optimization often occurs. That means while the individual activities in that system appear to be operating well, the net result on the total system is relatively poor performance. To understand the opportunities for improvement, and the implication of those opportunities, the system must be viewed as a whole.

Without understanding the channel-wide implications of logistics decisions to improve service levels, excess inventory will begin to build up at the links along the supply chain. This excess inventory will tend to increase costs throughout the channel, but it serves as a buffer to protect against the uncertainty of how other channel members will behave. Thus, the system as a whole is less efficient than it could otherwise be. To get around that issue, organizations like Hewlett-Packard's DeskJet Division have taken a systems approach to managing channel inventories.

The systems approach is at the core of the next several topics discussed. The systems approach is key to understanding the role of logistics in the economy, its role in the organization, including its interface with marketing, the total cost concept, and logistics strategy.

While it might be desirable to have high inventory levels in order to improve customer order fulfillment, high inventory levels increase storage costs as well as the risk of obsolescence. Those unfavorable factors must be "traded off" with the favorable aspects of a decision before arriving at a decision on inventory levels. Without considering the impact of decisions on the larger system, such as the firm or the distribution channel, sub-optimization often occurs. That means while the individual activities in that system appear to be operating well, the net result on the total system is relatively poor performance. To understand the opportunities for improvement, and the implication of those opportunities, the system must be viewed as a whole.

Without understanding the channel-wide implications of logistics decisions to improve service levels, excess inventory will begin to build up at the links along the supply chain. This excess inventory will tend to increase costs throughout the channel, but it serves as a buffer to protect against the uncertainty of how other channel members will behave. Thus, the system as a whole is less efficient than it could otherwise be. To get around that issue, organizations like Hewlett-Packard's DeskJet Division have taken a systems approach to managing channel inventories.

The systems approach is at the core of the next several topics discussed. The systems approach is key to understanding the role of logistics in the economy, its role in the organization, including its interface with marketing, the total cost concept, and logistics strategy.

### **The Relationship of Logistics Activities to Logistics Costs**

Logistics costs are driven or created by the activities that support the logistics process. Each of the major cost categories – customer service, transportation, warehousing, order processing and information, lot quantity and inventory carrying – are discussed below.

*Customer Service Levels.* The key cost trade-off associated with varying levels of customer service is the cost of lost sales. Monies that are spent to support customer service include the costs associated with order fulfillment, parts, and service support. They also include the costs of return goods handling, which has a major impact on a customer's perception of the organization's service as well as the ultimate level of customer satisfaction.

The cost of lost sales includes not only the lost contribution of the current sale, but also potential future sales from the customer and from other customers due to word-of-mouth negative publicity from former customers. A recent estimate indicated that every disgruntled customer tells an average of nine others about his or her dissatisfaction with the product or service. It is no wonder that it is extremely difficult to measure the true cost of customer service!

Thus, the best approach is to determine desired levels of customer service based on customer needs, and how those needs are affected by expenditures on other areas of the marketing mix. The idea is to minimize the total cost, given the customer service objectives. Because each of the other five major logistics cost elements work together to support customer service, good data are needed regarding expenditures in each category.

*Transportation Costs.* The activity of transporting goods drives transportation costs. Expenditures that support transportation can be viewed in many different ways, depending on the unit of analysis. Costs can be categorized by customer, product line, type of channel such as inbound versus outbound, and so on. Costs vary considerably with volume of shipment (cube), weight of shipment, distance, and point of origin and destination. Costs and service also vary considerably with the mode of transportation chosen.

*Warehousing Costs.* Warehousing costs are created by warehousing and storage activities, and by the plant and warehouse site selection process. Included are all of the costs that vary due to a change in the number or location of warehouses.

*Order Processing/Information Systems Costs.* This category includes costs related to activities such as order processing, distribution communications, and forecasting demand. Order processing and information costs are an extremely important investment to support good customer service levels and control costs. Order processing costs include such costs as order transmittal, order entry, processing the order, and related internal and external costs such as notifying carriers and customers of shipping information and product availability. Shippers and carriers have invested a great deal in improving their information systems, to include technology such as electronic data interchange (EDI), satellite data transmission, and bar coding and scanning shipments and sales. There also has been a growth in more sophisticated information technology, such as decision support systems, artificial intelligence (AI), and expert systems.

*Lot Quantity Costs.* The major logistics lot quantity costs are due to procurement and production quantities. Lot quantity costs are purchasing- or production-related costs that vary with changes in order size or frequency and include:

1. Setup costs.
  - a. Time required to set up a line or locate a supplier and place an order.
  - b. Scrap due to setting up the production line.
  - c. Operating inefficiency as the line begins to run, or as a new supplier is brought on board.
2. Capacity lost due to downtime during changeover of line or changeover to a new supplier.

3. Materials handling, scheduling, and expediting.
4. Price differentials due to buying in different quantities.
5. Order costs associated with order placement and handling.

These costs must not be viewed in isolation because they also may affect many other costs. For example, a consumer goods manufacturer that produces large production runs may get good prices from suppliers and have long efficient production runs, but requires more storage space to handle large runs. Customer service levels may suffer as order fulfillment declines because products are produced infrequently, in large batches, and with inventory going to zero and creating stockout situations in between runs. This may increase information and order processing costs, as customers frequently call to check on availability of back-ordered products, and cancel back orders.

Transportation costs also may rise as customers are sent partial or split shipments. Inventory carrying costs will rise as large quantities of inventory are held until depleted, due to large batch sizes. The implication of one cost upon another must be explicitly considered

*Inventory Carrying Costs.* The logistics activities that make up inventory carrying costs include inventory control, packaging, and salvage and scrap disposal. Inventory carrying costs are made up of many elements. For decision-making purposes, the only relevant inventory costs to consider are those that vary with the amount of inventory stored. The four major categories of inventory cost are:

1. Capital cost, or opportunity cost, which is the return that the company could make on the money that it has tied up in inventory.
2. Inventory service cost, which includes insurance and taxes on inventory.
3. Storage space cost, which includes those warehousing space-related costs which change with the level of inventory.
4. Inventory risk cost, including obsolescence, pilferage, relocation within the inventory system, and damage.

### **Developing Logistics Strategy**

Understanding the organization's overall strategy and the key trade-offs in that organization are important to developing logistics strategy. The primary goal of logistics in any

organization is to support the organization's customer service goals in an effective and efficient manner. To do that, the logistics function and the organization's management need to know:

1. What do customers desire in terms of customer service levels and capabilities?
2. How is the competition performing in terms of customer service?
3. How is the organization performing today compared with the competition and, particularly, on those areas that the customer perceives as important?

Logistics costs also are an important aspect of analyzing alternative logistics service offerings.

Answering questions one and two above can be accomplished through a marketing and logistics audit of the external environment. Answering the third question can be accomplished by conducting an internal audit in conjunction with customer service, in conjunction with strategy.

Based on this analysis, an organization can identify its own strengths and weaknesses, and what may be potential opportunities and hazards in the marketplace. Objectives or goals for the logistics function are thus formulated. Based on the objectives, alternative strategies or plans of action need to be developed in support of those objectives. The analysis should include the implications of each alternative on other functions and performance parameters, as well as an analysis of the total cost of each alternative. Thus, a systems approach is required.

Once a decision has been made concerning logistics strategy, the organization must ensure that its current logistics structure is adequate to achieve that strategy, or adjust the channel structure accordingly. Proper channel design is an important concern for logistics professionals.

### **Future Challenges and Areas for Logistics Performance Improvement**

As the role of logistics grows and takes on greater importance in achieving the overall goals of the organization, logistics needs to meet the challenge and improve its performance to support those goals. Some areas of opportunity include:

1. Greater participation in setting organizational strategy and the strategic planning process.
2. Total quality management (TQM).
3. Identification of opportunities for using logistics as a competitive weapon/marketing strength.
4. Just-in-time (JIT) logistics.
5. The use of quick response (QR) and efficient consumer response (ECR) techniques.
6. Improved understanding of and accounting for logistics costs.
7. Better understanding of global logistics issues and improved logistics information systems.
8. Greater participation of logistics professionals on work teams.
9. Appropriate understanding and use of outsourcing, partnerships, and strategic alliances.
10. Greater understanding and appropriate application of technology.
11. Green marketing.

Each of these issues is explored below.

#### ***1. Strategic Planning and Participation***

Many surveys show the increasing participation of the logistics function in competitive strategy. Activities such as logistics budgeting and control, inventory planning and positioning, and customer service have become important parts of the organization's strategic planning process. A study supported by the Council of Logistics Management illustrates that strategic planning is performed by the majority of logistics



organizations studied. Bergen Brunswig, a multibillion dollar drug wholesaler, reports that logistics participation in strategic planning is critical, with the vice president of Logistics attending corporate strategy meetings and serving on the task force which thinks strategically about the future.

### ***Total Quality Management***

Total quality management (TQM) is a philosophy that should be embedded in all aspects of logistics operations. Going beyond simple "quality control," which monitors for problems in actual performance after the fact, TQM is a philosophy that is integrated in designing logistics systems to achieve desired results, performing logistics activities, and monitoring results. Total quality management involves being proactive in performing the right activity the right way the first time, and continuing to perform it to the required level. In logistics, that could translate into short, predictable transit times, certain levels of in-stock availability, and certain fill rates on customer orders.

One reason that logistics has received more attention as a strategic function is the growing recognition given to it in the Malcolm Baldrige National Quality Award. This award, administered by the U.S. Department of Commerce, was designed to recognize organizations that have achieved an outstanding level of quality and competitive excellence in the global marketplace. Many organizations are using the award criteria to evaluate and improve their quality procedures, even if they do not intend to apply for the award.

Twenty-five percent of the points used in judging applicants for awards are based on customer satisfaction. The "customer focus and satisfaction" category rates the company's knowledge of the customer, responsiveness, overall customer service systems, and ability to meet requirements and expectations. Thus, an organization must have a good logistics system and include logistics in its strategic planning process to score well in this major area.

The ISO 9000 (International Organization for Standardization) series is an internationally recognized certification program whereby the quality processes of firms are audited to verify whether they have well-documented and effective quality processes in place. It was born in Europe in 1987 in an effort to support trade between countries and companies.

### ***Just-in-Time***

Just-in-time (JIT) is an inventory management philosophy aimed at reducing waste and redundant inventory by delivering products, components, or materials just when an organization needs them. JIT has profound implications on logistics systems. JIT requires close coordination of demand needs among logistics, carriers, suppliers, and manufacturing. JIT also represents a tremendous opportunity for the logistics function to contribute to the organization's success by reducing inventory while simultaneously maintaining or improving customer service levels. Thus, JIT represents an important trend in inventory management that will be discussed throughout this text. Applications of JIT principles to the retail and grocery sectors are discussed below in relation to quick response and efficient consumer response.

### ***Quick Response***

Quick response (QR) is a retail sector strategy which combines a number of tactics to improve inventory management and efficiency, while speeding inventory flows. Most QR is between manufacturer and retailer only. When fully implemented, QR applies JIT principles throughout the entire supply chain, from raw material suppliers through ultimate customer demand.

The concept works by combining electronic data interchange (EDI) with bar coding technology, so that the customer sales are tracked immediately. This information can be passed on to the manufacturer, who can then notify its raw material suppliers, and schedule production and deliveries as required to meet replenishment needs. This allows inventory reductions while speeding response time, lowering the number of out-of-stock products, and reducing handling and obsolescence. While QR began in the textile and apparel industry, it is now being applied by many industries in the retail sector. The grocery industry has begun an adaptation of this approach, called efficient consumer response.

QR has had a major impact on distribution operations. Rather than "warehousing" product, distribution centers are now charged with "moving" the product through quickly. This frequently entails cross-docking, whereby the inbound product is unloaded, sorted by store, and reloaded onto trucks destined for a particular store, without ever being warehoused. As a result of QR, Mercantile Stores has reduced the number of distribution centers it owns from 12 to 8.

To further improve retail efficiency, some suppliers are shipping goods prehung and preticketed. This concept, known as "floor-ready merchandise," is growing in popularity. As noted by Randy Bumette, director of QR for Mercantile, "Our strategy and goal is to maximize the portion of business that is floor ready." One retail executive commented that merchandise routinely spends an additional three days in the distribution center (DC) if it does not have retail price tickets and the proper hangers. Floor-ready merchandise may lead to a reduction in the number of DCs, and processing time can be greatly reduced.

### ***Efficient Consumer Response***

Efficient consumer response (ECR) combines several logistics strategies in an effort to improve the competitiveness of the grocery industry by cutting waste in the supply chain. It is the grocery industry's answer to QR. ECR includes the following strategies:

1. Widespread implementation of electronic data interchange up and down the supply chain, both between suppliers and manufacturers, manufacturers and distributors, and distributors and customers.
2. Greater use of point-of-sale data obtained by greater and more accurate use of bar coding.
3. Cooperative relationships between manufacturers, distributors, suppliers, and customers.
4. Continuous replenishment of inventory and flow through distribution.
5. Improved product management and promotions.

By applying the fourth point, continuous replenishment and flow through distribution, inventory is managed on a just-in-time basis, rather than stockpiled in warehouses and distribution centers. Product is cross-docked, whereby it is unloaded at one dock, broken down into store-sized shipments, and reloaded on trucks to go directly to the stores. Thus, cooperation and coordination are very important to ensure proper sequencing of truck loading and unloading, as well as the proper product mix. The belief is that the potential exists to reduce pipeline inventory by up to 40 percent.

A key feature of ECR that distinguishes it from QR is the emphasis on moving away from the grocery industry's "deal mentality." Cooperation is required among industry participants to move away from the heavy use of promotional strategies. Such strategies encourage grocers to "stockpile" or forward buy product due to promotions such as a temporary low price or "buy two, get one free" deals. This creates excessive inventory in the supply chain, and reduces the number of times inventory turns over each year.

The ECR strategy was developed to offset some of the pressure on the grocery industry by mass merchandisers like Wal-Mart, and Warehouse clubs. It will be referred to throughout the text.

### ***Logistics as a Competitive Weapon***

Logistics may be the best source of competitive advantage for a firm because it is less easily duplicated than other elements of the marketing mix: product, price, and promotion. Consider, for example, forming close, ongoing relationships with carriers or logistics service providers can help give the firm a distinct competitive advantage in speed to the customer, reliability, availability, or other customer service factors.

The power of logistics in achieving an organization's customer service goals and supporting customer satisfaction has received an increased amount of attention in the press. Companies that understand and utilize the potential of logistics as a competitive weapon include logistics as a key component of their strategic planning process. In recognition of the key role of logistics in supporting strategic customer service initiatives, the logistics function of Levi Strauss and Company began reporting to marketing rather than operations in 1990. To support this, logistics began formal strategic planning for 1990.

### ***Accounting for Logistics Costs***

Implementation and utilization of the integrated logistics concept requires total cost analysis to be effective. The focus of management should be to minimize total logistics costs for a given customer service level.

In general, accounting systems have not changed and adapted to accurately account for the many trade-offs inherent in logistics activity and logistics decision making. The availability of timely, accurate, and meaningful logistics information is relatively rare in practice. However, this is beginning to change as more organizations move into activity-based costing (ABC) systems to allocate costs to activities on a more accurate and meaningful basis. Much work remains to be done in this area.

In addition, accounting and management support systems that are flexible in nature are needed. Logistics professionals must be able to get the information re-

quired to make decisions as they arise. Not all logistics decisions can be anticipated in advance and prepared for in a regularly scheduled logistics report. Thus, accounting systems that provide easy access to real-time data are needed to support unanticipated decisions.

### ***Logistics as a Boundary-Spanning Activity***

As we have described extensively in this chapter, the logistics function and the activities performed by logistics do not exist in isolation. Logistics plays a key role in activities throughout the supply chain, both within and outside the organization. Outside the organization, logistics interfaces with customers in the order processing, order fulfillment, and delivery cycles. Logistics also interfaces with carriers, warehouseers, suppliers, and other third parties that play a role in the supply chain.

Within the organization, logistics interfaces with virtually every functional area in some capacity. Logistics interfaces with finance in the planning process and in the analysis of capital expenditures on investments in building and equipment to support distribution, transportation, warehousing, information technology, and related issues.

Logistics interfaces with accounting in establishing logistics costs (transportation, distribution, storage) for various products, customers, and distribution channels. Logistics also requires information from accounting regarding budgets and actual expenditures.

As discussed earlier, the interaction of logistics with other marketing activities is extensive. Logistics plays an instrumental role in customer satisfaction by providing high levels of customer service through good product availability, reliable service, and efficient operations that keep prices competitive.

Logistics must work closely with production and operations in a number of capacities. First, logistics often receives order releases for materials from production, and it needs to ensure that the items required are ordered, transported, and received on a timely basis. Storage also may need to be arranged. Logistics often manages the flow of materials or work in process within the organization. Logistics also must work with production in terms of stocking and shipping the finished product as it is available.

Logistics should be involved with research and development, product engineering, packaging engineering, and related functions in the new product development process. This often occurs through logistics participation on a new product team. It is vital for the logistics area to be represented very early in the new product development process. This is critical in terms of designing the proper distribution channel, anticipating needs for inventory buildup, ensuring the availability of materials for production, and properly configuring the packaging for maximum efficiency and production within the distribution channel.

An increasing number of organizations are using the team approach to facilitate communications, create buy-in from multiple functions, and to anticipate problems. Logistics should be an active participant on teams that deal with issues affecting the supply chain.

Within the organization, logistics interfaces with virtually every functional area in some capacity. Logistics interfaces with finance in the planning process and in the

analysis of capital expenditures on investments in building and equipment to support distribution, transportation, warehousing, information technology, and related issues.

Logistics interfaces with accounting in establishing logistics costs (transportation, distribution, storage) for various products, customers, and distribution channels. Logistics also requires information from accounting regarding budgets and actual expenditures.

As discussed earlier, the interaction of logistics with other marketing activities is extensive. Logistics plays an instrumental role in customer satisfaction by providing high levels of customer service through good product availability, reliable service, and efficient operations that keep prices competitive.

Logistics must work closely with production and operations in a number of capacities. First, logistics often receives order releases for materials from production, and it needs to ensure that the items required are ordered, transported, and received on a timely basis. Storage also may need to be arranged. Logistics often manages the flow of materials or work in process within the organization. Logistics also must work with production in terms of stocking and shipping the finished product as it is available.

Logistics should be involved with research and development, product engineering, packaging engineering, and related functions in the new product development process. This often occurs through logistics participation on a new product team. It is vital for the logistics area to be represented very early in the new product development process. This is critical in terms of designing the proper distribution channel, anticipating needs for inventory buildup, ensuring the availability of materials for production, and properly configuring the packaging for maximum efficiency and production within the distribution channel.

An increasing number of organizations are using the team approach to facilitate communications, create buy-in from multiple functions, and to anticipate problems. Logistics should be an active participant on teams that deal with issues affecting the supply chain.

### ***Global Logistics***

Many leading organizations are heavily involved in international markets through purchasing inputs to production, other importing, exporting, joint ventures, alliances, foreign subsidiaries and divisions, and other means. This creates a need for familiarity with global logistics and global logistics networks. This need is likely to continue in the future. The Ohio State University's study of logistics career patterns reported that the top-rated global trends that are expected to have an impact on the careers of logistics professionals are:

The growth of information technology (21 percent)

Supply chain management (15 percent)

Globalization (11 percent)

### ***Increasing Skill Requirements***

As suggested above, the demands on logistics professionals are increasing. As logisticians become increasingly involved in setting corporate strategy and other aspects of the strategic planning process, different skill sets are required in quality is-

sues, global logistics, and improving relationships with third-party providers. One of the best sources of longitudinal data for trends in logistics careers has been the Logistics Career Patterns Study conducted annually by The Ohio State University. This study indicates that the greatest proportion of logistics time and effort is spent on general management issues.

A small percentage of time is spent on very repetitive issues such as order entry and packaging. Information systems also are playing an increasingly important role in logistics.

### ***Logistics Information Systems***

Part of an organization's ability to use logistics as a competitive weapon is based on its ability to assess and adjust actual logistics performance real time. This means the ability to monitor customer demands and inventory levels as they occur, to act in a timely manner to prevent stockouts, and to communicate potential problems to customers. This requires excellent, integrated logistics information systems. These systems impact all of the logistics activities presented earlier, and must be integrated and take into account marketing and production activities. Such systems also must be integrated with other members of the supply chain, to provide accurate information throughout the channel from the earliest supplier through the ultimate customer.

Logistics information systems may link a variety of information technologies, as is the case with Wal-Mart. Wal-Mart uses EDI to communicate with suppliers, receiving information such as shipment, timing, quantities, and even invoicing. It uses bar coding to scan sales as customers make their purchases. The bar-coded information is thus captured at the point of sale. Wal-Mart then downloads the information to suppliers. Suppliers use these data to determine the orders they need to supply to Wal-Mart, rather than having Wal-Mart create the orders. This system provides suppliers with rapid feedback on sales, so that they can anticipate production requirements based on accurate, near real-time sales data. Wal-Mart also benefits because it no longer has to place orders with many suppliers, and it can keep its inventory levels to a minimum.

### ***Outsourcing, Partnering, and Strategic Alliances***

During the 1980s, many organizations began to recognize that they could not effectively and efficiently "do it all" themselves and still remain competitive. They began to look to third-party specialists to perform activities that were not a part of their "core competency." This activity is known as outsourcing, in which an organization hires an outside organization to provide a good or service that it traditionally had provided itself, because this third party is an "expert" in efficiently providing this good or service, while the organization itself may not be.

Recently, outsourcing has been an area of growing interest and activity. Logistics outsourcing often involves third-party warehouses and use of public or contract transportation carriers. Outsourcing offers the opportunity for organizations to use the best logistics providers available to meet their needs. Outsourcing may involve a partnership relationship or be ad hoc, on a transaction to transaction basis. Traditionally, such relationships have been arm's-length, with each party concerned only for its own welfare.

Managers in many firms are accepting the concept of partnering or establishing close, long-term working relationships with suppliers of goods or services, customers, and third-party providers. This concept has been embraced by Bose Corporation, in the JIT II program. Bose uses the concept of an "in-plant," where key suppliers or service providers are actually on location at Bose's facility. Bose has such a relationship with Roadway Express, Inc. Bose states that this relationship creates efficiency between it and the carrier, creating improved communications, better service, and shared cost savings.

### *Strategic Alliances*

The most closely integrated partnerships are often referred to as strategic alliances. For a partnership to be a strategic alliance, it must be strategic in nature and must directly support one of the organization's distinctive competencies. Strategic alliances are rare in actual practice.

### *Technology*

There has been a proliferation of technological developments in areas that support logistics. As discussed above, there have been major technological developments in the information systems area: EDI, bar coding, point-of-sale data, and satellite data transmissions are only a few examples. In addition, improvements in automated warehousing capabilities should be integrated into logistics plans for upgrading technology. Technology is having a profound effect on the way that logistics personnel interface with other functional areas, creating the ability to access more timely, accurate information. Combining information technology with automated warehousing reduces inherent human variability, creating an opportunity to improve customer service.

### *Green Marketing*

Environmental issues have been an area of growing concern and attention for businesses on a global scale. Transportation and disposal of hazardous materials are frequently regulated and controlled. In Europe, organizations are increasingly required to remove and dispose of packaging materials used for their products. These issues complicate the job of logistics, increasing costs and limiting options. Organizations are continually looking at reducing, reusing, and reapplying packaging materials, by-products of production, and obsolete items. Companies are substituting items that are more readily recyclable. Some have even gone so far as to begin designing products with disassembly specifically in mind. These activities are covered in the term green marketing.

## **Creative Solutions**

### **Delivering the Goods**

National Semiconductor, the world's 13th largest computer chip manufacturer began looking at how to increase logistical efficiency in the early 1990s in an effort

to turn its profitability around. It discovered that it delivered 95 percent of its products within 45 days of the time they were. While this was not satisfactory, the other 5 percent required as much as 90 days! Since the customers could not be sure which 5 percent would be late, they required 90 days worth of stock on everything. The system was overloaded with inventory.

After doing a profitability analysis, National cut 45 percent of its product line. To get the remaining products to market on time, it simplified – going from 20,000 routes on 12 airlines, involving 10 warehouses, to 1 central facility in Singapore. To speed that product to market, it hired Federal Express to handle all of its sorting, shipping, and storage at its Singapore distribution center. This has resulted in major operating improvements. National can move products from factory to customer in four days or less. Distribution costs are down from 2.6 percent of revenues to 1.9 percent.

### Hewlett-Packard's Systems Approach to Inventory Management

Hewlett-Packard (HP) is a leading global supplier of computer printers, particularly the ink-jet and laser-jet variety. It has over \$3 billion invested in inventory worldwide. HP has a division located in Vancouver, Washington, which manufactures and distributes the DeskJet Plus printer worldwide. It has three distribution centers, one each in North America, Europe, and Asia.

HP faced a situation where high inventories of printers, approximately seven weeks' worth, were required to meet their 98 percent service goal in Europe. High inventories were required in part because each country has unique power cord and transformer requirements, and needs the proper language manual. Initially, the "differentiation" of the printers to meet the needs of the local market was done at the Vancouver facility. HP apparently faced the prospect of high inventory costs or reduced customer service levels, neither of which was an acceptable option.

The management at the Vancouver site considered many options for reducing inventory while maintaining customer service. They first worked on improving the logistics system by reducing delivery variability. They considered faster shipping modes, such as air, to reduce transit inventory, and inventory held to cover lead times. That alternative proved too costly.

However, by looking at the entire system as a whole, HP was able to develop a better solution. It could delay the differentiation of printer power sources and manuals until firm orders were received. This allowed HP to reduce inventory to five weeks while maintaining 98 percent service levels. This saved over \$30 million annually. In addition, transportation dropped by several million dollars because generic printers can be shipped in larger volumes than printers specific to a particular country. Because HP viewed the system as a whole and understood the interactions, they were able to develop this innovative logistical solution.

### Quick Response, Canadian Style

Executives at Toronto-based Hudson's Bay Company left the pioneering spirit to U.S. retailers when it came to developing quick response technology. They sat on the sidelines watching and learning from their U.S. counterparts for years.



Then, in late 1991 the decision was made to implement QR technology. Hudson's Bay executives quickly made up for lost time. Everything from UPC codes to floor-ready processes were set up and put into effect in less than two years. Ironically, as U.S. retailers and manufacturers hammer out guidelines for floor-ready merchandise today, they're looking to their neighbors to the north for tips.

According to Peggy Macek, director of merchandise systems at Hudson's Bay Company, getting suppliers to comply with the various standards, including floor-ready merchandise processing, involves a lot of partnering and understanding, and a bit of clout and coercion as well.

"We made it very clear to our suppliers what we expected of them, and gave them guidelines for making it happen. To our way of thinking, there was no sense talking QR without having merchandise floor ready, and we did our best to help them see the benefits of coming on line," says Macek. "There were suppliers who balked initially, but we're the largest retailer in Canada. They quickly came to the conclusion that you can't fight city hall."

No doubt, the fact that The Bay cut off one of its largest suppliers for one month for refusing to comply with standards sent a clear message to Canadian manufacturers.

Currently, the retailer requires suppliers to price merchandise prior to shipping. Hangers have been standardized by merchandise type, and shipping cartons are moving through the DC [distribution center] without being opened.

While the Canadian retail scene is quite different from that in the United States – fewer retailers and manufacturers are more spread out, for example – the benefits realized by The Bay are significant.

"We're saving millions of dollars in distribution functions," reports Macek. "We used to have five distribution centers. Now, because of the technology that's been implemented and the speed with which we can push goods through the pipeline, we were able to shut down three DCs."

In the past, it took as long as two to three weeks for product to get from the DC to the selling floor at The Bay. Today, product bound for stores in Toronto and Montreal is usually on the selling floor within a day or two of arriving at the DC. Stores located in more remote areas of the country can have product on the selling floor five to six days after arrival at the DC.

Hudson's Bay Company, the oldest retailer in North America, had total sales in excess of \$5 billion in 1993. The retailer operates 102 full-line department stores called The Bay, and a discount store division known as Zellers.

#### Hewlett-Packard's Systems Approach to Inventory Management

Hewlett-Packard (HP) is a leading global supplier of computer printers, particularly the ink-jet and laser-jet variety. It has over \$3 billion invested in inventory worldwide. HP has a division located in Vancouver, Washington, which manufactures and distributes the DeskJet Plus printer worldwide. It has three distribution centers, one each in North America, Europe, and Asia.

HP faced a situation where high inventories of printers, approximately seven weeks' worth, were required to meet their 98 percent service goal in Europe. High in-

ventories were required in part because each country has unique power cord and transformer requirements, and needs the proper language manual. Initially, the "differentiation" of the printers to meet the needs of the local market was done at the Vancouver facility. HP apparently faced the prospect of high inventory costs or reduced customer service levels, neither of which was an acceptable option.

The management at the Vancouver site considered many options for reducing inventory while maintaining customer service. They first worked on improving the logistics system by reducing delivery variability. They considered faster shipping modes, such as air, to reduce transit inventory, and inventory held to cover lead times. That alternative proved too costly.

However, by looking at the entire system as a whole, HP was able to develop a better solution. It could delay the differentiation of printer power sources and manuals until firm orders were received. This allowed HP to reduce inventory to five weeks while maintaining 98 percent service levels. This saved over \$30 million annually. In addition, transportation dropped by several million dollars because generic printers can be shipped in larger volumes than printers specific to a particular country. Because HP viewed the system as a whole and understood the interactions, they were able to develop this innovative logistical solution.

#### Problem: Torn in the U.S.A.

Call it the American dilemma: a company with long-range ideals that is required to show short-term results.

In order to satisfy the demanding financial community, a client of consultant Ernst & Young must demonstrate ever-improving earnings on a quarterly basis. At the same time, it must boost profitability by rapidly introducing new products. Virtually no lag is permitted, according to Stan Brown and Mike Brown, senior managers of Ernst & Young. Yet this relentless pressure is having a serious impact on the company's supply-chain performance.

One of this company's business units experiences a demand spike in sales during the last few days of each month. Up to half its monthly business might be transacted in that brief period. But the irregular pattern of supply and demand isn't the result of any oddities in the industry. It's purely an artificial situation, caused by the sales force scrambling for business at the end of each reporting period. Often that means artificially pulling demand forward to make sales targets. What's more, the erratic pace of sales leads to periods during which the company might not have enough inventory to fulfill demand.

Two problems result. One is that retailers are conditioned to order product only when promotions are provided, so they wait until then in hope of securing deep discounts. The other is that the seller's warehouse is overwhelmed by orders as it struggles to cope with a 150 percent utilization factor during a 24-hour period. Naturally, the warehouse is viewed by sales "as the bad guy, because it can't deliver," says Stan Brown.

The challenge: In a situation that is driven by the financial community – the demand for short-term profits – where is this company's leverage? What can it do to smooth out the flow of product without seriously compromising its profitability?

## List of Abbreviations

CEO – chief executive officer  
MRP – materials requirement planning  
DRP – distribution resource planning  
JIT – just-in-time  
GDP – gross domestic product  
EDI – electronic data interchange  
EFT – electronic funds transfer  
AI – artificial intelligence  
TQM – total quality management  
QR – quick response  
ECR – efficient customer response  
ISO – international organization for standardization  
DC – distribution centre  
ABC – activity-based costing

## The List of Proper Names Used in the Booklet

**The Hewlett-Packard Company** (commonly referred to as HP) is an American multinational information technology company headquartered in Palo Alto, California. It developed and provided a wide variety of hardware components as well as software and related services to consumers, small- and medium-sized businesses (SMBs) and large enterprises, including customers in the government, health and education sectors.

The company was founded in a one-car garage in Palo Alto by William "Bill" Redington Hewlett and David "Dave" Packard starting with a line of electronic test equipment. HP was the world's leading PC manufacturer from 2007 to Q2 2013, after which Lenovo remained ranked ahead of HP. It specialized in developing and manufacturing computing, data storage, and networking hardware, designing software and delivering services. Major product lines included personal computing devices, enterprise and industry standard servers, related storage devices, networking products, software and a diverse range of printers and other imaging products. HP marketed its products to households, small- to medium-sized businesses and enterprises directly as well as via online distribution, consumer-electronics and office-supply retailers, software partners and major technology vendors. HP also had services and consulting business around its products and partner products.

Hewlett-Packard company events included the spin-off of its electronic and bio-analytical measurement instruments part of its business as Agilent Technologies in 1999, its merger with Compaq in 2002, and the acquisition of EDS in 2008, which led to combined revenues of \$118.4 billion in 2008 and a Fortune 500 ranking of 9 in 2009. In November 2009, HP announced the acquisition of 3Com, with the deal closing on April 12, 2010. On April 28, 2010, HP announced the buyout of Palm, Inc. for \$1.2 billion. On September 2, 2010, HP won its bidding war for 3PAR with a \$33 a share offer (\$2.07 billion), which Dell declined to match.

On October 6, 2014, Hewlett-Packard announced plans to split the PC and printers business from its enterprise products and services business. The split closed on November 1, 2015 and resulted in two publicly traded companies: HP Inc. and Hewlett Packard Enterprise.

**Honda Motor Co., Ltd.** is a Japanese public multinational corporation primarily known as a manufacturer of automobiles, motorcycles and power equipment.

Honda has been the world's largest motorcycle manufacturer since 1959, as well as the world's largest manufacturer of internal combustion engines measured by volume, producing more than 14 million internal combustion engines each year. Honda became the second-largest Japanese automobile manufacturer in 2001. Honda was the eighth largest automobile manufacturer in the world behind General Motors, Volkswagen Group, Toyota, Hyundai Motor Group, Ford, Nissan, and PSA Peugeot Citroën in 2011.

Honda was the first Japanese automobile manufacturer to release a dedicated luxury brand, Acura, in 1986. Aside from their core automobile and motorcycle businesses, Honda also manufactures garden equipment, marine engines, personal watercraft and power generators, and other products. Since 1986, Honda has been involved with artificial intelligence/robotics research and released their ASIMO robot in 2000. They have also ventured into aerospace with the establishment of GE Honda Aero Engines in 2004 and the Honda HA-420 HondaJet, which began production in 2012. Honda has three joint-ventures in China (Honda China, Dongfeng Honda, and Guangqi Honda).

In 2013, Honda invested about 5.7% (US\$6.8 billion) of its revenues in research and development. Also in 2013, Honda became the first Japanese automaker to be a net exporter to the United States, exporting 108,705 Honda and Acura models, while importing only 88,357.

**General Motors**, commonly known as GM, is an American multinational corporation headquartered in Detroit, Michigan, that designs, manufactures, markets and distributes vehicles and vehicle parts and sells financial services. General Motors produces vehicles in 37 countries under thirteen brands: Alpheon, Chevrolet, Buick, GMC, Cadillac, Holden, HSV, Opel, Vauxhall, Wuling, Baojun, Jie Fang, UzDae-woo. General Motors holds a 20% stake in IMM, and a 77% stake in GM Korea. It also has a number of joint-ventures, including Shanghai GM, SAIC-GM-Wuling and FAW-GM in China, GM-AvtoVAZ in Russia, Ghandhara Industries in Pakistan, GM Uzbekistan, General Motors India, General Motors Egypt, and Isuzu Truck South Africa. General Motors employs 212,000 people and does business in more than 120 countries. General Motors is divided into five business segments: GM North America (GMNA), Opel Group, GM International Operations (GMIO), GM South America (GMSA), and GM Financial. As part of its 2009 bankruptcy restructuring the current company, General Motors Company LLC, ("new GM"), was formed in 2009, after the bankruptcy of the General Motors Corporation ("old GM"). The new company purchased the majority of the assets of "old GM", including the name "General Motors".

**Wal-Mart** Stores, Inc., is an American multinational retail corporation that operates a chain of hypermarkets, discount department stores and grocery stores. Headquartered in Bentonville, Arkansas, the company was founded by Sam Walton in 1962 and incorporated on October 31, 1969. As of February 29, 2016, Walmart has 11,527 stores in 27 countries, under a total of 72 banners. The company operates under the Walmart name in the United States and Canada. It operates as Walmart de México y Centroamérica in Mexico, as Asda in the United Kingdom, as Seiyu in Japan, and as Best Price in India. It has wholly owned operations in Argentina, Brazil, and Canada. It also owns and operates the Sam's Club retail warehouses.

A **warehouse club** is a retail store, usually selling a wide variety of merchandise, in which customers may buy large, wholesale quantities of the store's products, which makes these clubs attractive to both bargain hunters and small business owners. The clubs are able to keep prices low due to the no-frills format of the stores. In addition, customers may be required to pay annual membership fees in order to shop.

The concept is similar to the consumers' cooperative supermarkets found in Europe, though using bigger stores and not co-operatively owned. The use of members' prices without co-operative ownership is also sometimes used in bars and casinos.

**Peter Drucker**, the well-known American business professor and consultant.

**DeskJet** is a brand name for inkjet printers manufactured by Hewlett-Packard. These printers range from small domestic to large industrial models, although the largest models in the range have generally been dubbed DesignJet.

**Xerox** is an American global corporation that sells business services and document technology products. Xerox is headquartered in Norwalk, Connecticut (moved from Stamford, Connecticut in October 2007), though its largest population of employees is based around Rochester, New York, the area in which the company was founded. The company purchased Affiliated Computer Services for \$6.4 billion in early 2010. As a large developed company, it is consistently placed in the list of Fortune 500 companies.

**Sears** (officially Sears, Roebuck & Co.) is an American chain of department stores. The company was founded by Richard Warren Sears and Alvah Curtis Roebuck in 1886; it was previously based in the Sears Tower in Chicago, and is currently headquartered in Hoffman Estates, Illinois. It began as a mail order catalog company, and began opening retail locations in 1925. The company was bought by the American discount store chain Kmart in 2005, which was in bankruptcy at the time and renamed itself Sears Holdings upon completion of the merger. In terms of domestic revenue, Sears was the largest retailer in the United States until October 1989, when it was surpassed by Walmart. It is the fifth-largest American department store company by sales as of October 2013 (behind Walmart, Target, Best Buy, and Home Depot), and it is the twelfth-largest retailer in the country overall. It operates divisions in Canada and Mexico, among several subsidiaries within its brand.

## References

1. Christopher M. Logistics & Supply Chain Management. – Harlow: Financial Times Prentice, 2005. – 305 p.
2. Grusendorf M. English for Logistics. – Oxford: Oxford Univ. Press, 2013. – 95 p.
3. Pilbeam A., O’Driscoll N. Logistics Management. – Harlow: Longman, 2010. – 98 p.
4. Woods D.F., Barone A., Murphy P., Wardlow D.L. International Logistics. – N.Y.: Amacom, 2002. – 457 p.

Учебное издание

**Составители:**

*Петр Николаевич Резько*

*Валерий Иванович Рахуба*

# **Fundamentals of Logistics**

**Методические рекомендации**

**по дисциплине «Иностранный (английский) язык»**

**для студентов специальности 10 – 26 02 05 «Логистика»**

Ответственный за выпуск: Рахуба В.И.

Редактор: Боровикова Е.А.

Компьютерная вёрстка: Соколюк А.П.

Корректор: Никитчик Е.В.

---

Подписано в печать 06.05.2016 г. Формат 60x84 <sup>1</sup>/<sub>16</sub>. Бумага «Performer».  
Гарнитура «Times New Roman». Усл. печ. л. 3,72. Уч. изд. л. 4,0. Заказ № 540. Тираж 40 экз.  
Отпечатано на ризографе учреждения образования «Брестский государственный  
технический университет». 224017, г. Брест, ул. Московская, 267.

