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LOGISTICS AND TRANSPORT

Logistic services



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I. LOGISTIC SERVICES

I.I. Logistic services

Logistics services - are defined as personalized services provided by logistics providers intended to client companies (customers) in relation with outsourcing in logistics.

Logistics services - are defined as personalized services provided by logistics providers intended to client companies (customers) in relation with outsourcing in logistics (by transferring a partial logistics process or a set of activities to the provider), or logistics outsourcing (entrusting the provider with the solution, management and implementation of a comprehensive client logistics chain).

Logistics needs - they arise for business entities (manufacturers, traders, exporters, importers, etc.) in the context of placing their resources (capacities, including manufacturing, workers, goods and information) organized so that these resources are available at the appropriate location and when they are needed while respecting the principles of economy. Logistical needs are met (directly or indirectly) by logistics entities, among which logistics providers are key players.

The main activities that are necessary for the smooth flow of products from the place of origin to the place of their consumption:

- Customer service
- Demand forecasting/planning
- Inventory management
- Logistics communications
- Material handling
- Order processing
- Packaging
- Parts and service support
- Plant and warehouse site selection
- Procurement
- Return goods handling
- Reverse logistics
- Traffic (transport) and transportation
- Warehousing and storage

Main services of logistics providers

- transportation,
- storage,
- customs services,
- financial services related to cargo,
- IT services,
- support services such as reverse logistics, etc.

1.2. Outsourcing:

Outsourcing literally means "taking resources from elsewhere", however, it refers to utilizing external entities for performing internal processes in the enterprise (hiring external companies for activities commonly used internally).

Types of outsourcing:

It is divided according to the depth of outsourced activities or according to the position in the supply-customer chain.

The depth of outsourced activities

Depending on the depth of the transfer of rights and obligations between the entities, we can divide outsourcing into partial and complete. In the case of partial outsourcing, the contract owner does not transfer the rights and obligations of the strategic management of the activity to the supplier. In complete outsourcing, the supplier assumes more of the process obligations, and the contract owner only determines the strategy to achieve the goal. If partial outsourcing is know-how-demanding, especially with the contract owner, there is a need to maintain a logistics department. Within complete outsourcing, the contract owner's top management decides on the strategy.

- **The position of supply-customer chain**

We understand the supply-customer chain as a dynamic link between the consumption market and the markets of raw materials, materials and parts in its material aspect. An essential feature is the added value that is measured within the final added value of the entire chain. Outsourcing opportunities in the logistics chain:

- **Horizontal outsourcing:** it is used for overall optimization of individual activities within the chain. The supplier provides input and output logistics with its own resources and has the task of overall integration. It is typical of "4PL" subjects.
- **Vertical outsourcing:** there are 3PL entities, i.e. there are more suppliers and one main contract owner.

2. LOGISTICS SERVICE PROVIDERS

2.1. Groups of logistics service providers (LSP)

LSPs are divided into six groups, namely:

- Second Party Logistics providers (2PL),
- Third Party Logistics providers (3PL),
- Fourth Party Logistics providers (4PL),
- Fifth Party Logistics providers (5PL),
- Lead Logistics Partners (LLP),
- Courier, Express and Parcel Services providers (CEP).

2PL providers - a company orders individual logistics services from LSP.

3PL providers - take over complex implementation of a part of the logistics chain and ensure its result. Their own logistics infrastructure, i.e. the transport network and freight villages are typical of providers at this level.

4PL providers - offer comprehensive services including analysis, project solution, implementation and management of the whole logistics chain.

5PL providers - the principle of their operation consists in the virtual provision of comprehensive logistics services.

LLP - these providers take over from their client company all production plants management, including the mutual alignment of logistics chains in the automotive industry.

CEP - the offer of their services is wide; from the delivery of letters, documents, to packing, insurance, delivery confirmation, etc.

At present, the following categories of logistics service providers are of particular importance:

- Transport operators;
- Carriers;
- Forwarders;
- Courier, express and parcel services providers;

Third Party Logistics – 3PL;

Fourth Party Logistics – 4PL.

3. TRANSPORT SERVICES

3.1. Transport services as a logistics process

Transport - effective and intended movement of transport means along transport routes; relocation (transportation) activity in space and time - cargo or passengers.

Transport services - represent services directly related to the process of carrying goods (cargo; passengers) in space and time.

Carrier - is defined as a natural or legal person operating the transport for foreign or personal use. The carrier concludes a transport contract with the shipper, under which he undertakes to arrange transportation within the agreed time and price to the agreed place under his own name on his account.

Transportation - the resulting effect of the transport process (the relocation process).
Transportation services - include a whole range of relocation activities including relocation itself.

Shipping services – include a whole complex of activities related to relocation, including relocation itself.

Shipper - used to identify the carrier's customer, sometimes even the forwarder. This is a comprehensive name for the sender (exporter; consignor) and recipient (importer; consignee).

Specifics of transport services:

- According to the character of the transport route and the means of transport moving along this route, these are divided into the following transport sections:
- Railway,
- Road,
- Inland waterway,
- Maritime,
- Air,
- Multimodal; combined,
- Unconventional (oil pipelines, gas pipelines, suspended tracks and cableways, etc.).

Structure of the transport service process:

Transport process (the process of providing transport services) includes several interdependent (follow-up) activities, from a contractual collateral of transport to accounting the haulage (freightage; transportation charge).

4. FORWARDING SERVICES

4.I. Forwarding services

Freight forwarding services - represent services of all kinds that relate to the providing transportation offered by the forwarder to his principal (his customer).

Freight forwarder - is a person (legal or natural) who undertakes to provide transportation of goods in his own name and on behalf of his principal (consignor or consignee).

Freight forwarding, in the Czech Republic, is regarded as a free trade (Act No. 286/1995 Coll. - Act amending and supplementing Act No. 455/1991 Coll., On Trades Licensing). The provisions of the Commercial Code (Act No. 513/1991 Coll.) is applied to the forwarding agreement.

Freight forwarding – it is generally defined as a highly funded professional activity in which a freight forwarder procures the carriage of goods for a principal for remuneration. This activity is performed in the name of the freight forwarder in the interest and on behalf of the principal. Freight forwarders are very often called "transport architects", as they are currently a link between the supplier or the purchaser of the goods and the carrier. They can organize, manage and coordinate the entire transport process.

By freight forwarding contract the freight forwarder undertakes to procure the transportation of the shipment from a certain place to another specific place in his own name and on the account of the principal, or to procure or perform related transport operations, and the principal undertakes to pay the freight forwarder a reward.

The principal activities of the freight forwarder according to the **FIATA (International Federation of Freight Forwarders Associations)** is:

- to provide, organize and optimize goods transportation (carriage),
- to assist the principal (customer) in dealing with all transportation issues,
- to ensure the choice of the optimal transport route and the most suitable means of transport,
- to assist their principal in the payment process,
- to take care of all transport requirements and formalities related to the transportation services and their execution.

In field-oriented forwarding activities, FIATA defines the following forwarding activities:

- freight forwarding services by carrier: rail, road, air, maritime and inland forwarding (river cruises),
- freight forwarding services by function: e.g. shipping of piece goods as a collection cargo, combined and multimodal transport, express and parcel services, distribution warehousing,
- freight forwarding services by territory: e.g. forwarding services in river ports and seaports, border forwarding,
- freight forwarding services by commodity: e.g. textile, food, furniture and other specialized forwarding, or storage of special substrates,
- freight forwarding services by location (for example, storage forwarding services, forwarding services in duty-free zones, distribution centres, etc.).

5.STORAGE

5.1. Storage

Storage can be defined as part of an enterprise logistics system that ensures storage of products at the place of their origin and among the place of their origin and the place of their consumption.

Main use of warehouses in the field of supply and distribution of goods:

- Production support.
- Combination (mixing) of products.
- Consolidation.
- Dividing goods into smaller consignments.

Basic storage functions:

- Products relocation,
- Products storage,
- Information transfer.

5.2. Warehouse

Warehouse functions

- Equalizing function,
- Ensuring function,
- Finishing function,
- Speculation function.
- Enhancement functions.

Warehouses types

- According to their **position in the value-creation process**
 - Entrance warehouses,
 - Intermediate warehouses,
 - Sales warehouses.
- According to degree of **centralization**
 - Centralized warehouses,
 - Decentralized warehouses.

- According to potential **needs carriers**
 - General warehouses,
 - Standby warehouses,
 - Carry-on warehouses.

- According to **location**
 - Internal warehouse,
 - External warehouse.

- According to warehouses **management**
 - Own warehouse,
 - Foreign warehouse.

- According to **construction**
 - Indoor storage,
 - Open warehouse,
 - Solid warehouse,
 - Portable warehouse.

6.MATERIAL HANDLING

6.1. Material (goods) handling:

The term handling covers activities like professional displacement, loading, depositing and directing material in production and circulation including warehouses. Thus, it is a sum of operations consisting of loading, transportation, unloading and transshipment (re-loading) of semi-products and products, storage, packing, sorting as well as waste handling.

Basic terms:

Material - is a summary designation for raw materials, finished and unfinished products and goods (cargo) of all kinds as well as waste. It can be general, bulk, loose, liquid, gaseous.

Loading operations - are loading, unloading and reloading of material.

Fixation - securing material in transport means against movement during handling and transportation.

Packaging - protection of products with packaging materials from external influences

6.2. The importance of material handling:

The essential social importance of material handling is determined by these (selected) factors:

- material handling is a significant part of the total production time,
- material handling is part of the working hours of the production workers and can be substantially shortened,
- the need for areas for operations in production areas and warehouses depends on the level of material handling,
- creation of continuous material flow is one of the basic conditions for the implementation of current production,
- material handling is the area of the most difficult physical work and the source of most work injuries
- poor handling of material causes malfunctions in the supply of material to the machines and causes
- loss of machine and worker time.

6.3. Palletization

Palletization is a handling method where the material is still put on a pallet (underlay) with which it is transported at the same time.

Palletized cargo can be stacked in several layers above each other, i.e. stacking. Internationally agreed dimensions are used, in particular 800 x 1 200 x 144 mm (euro pallet) and 1 000 x 1 200 x 144 mm (industrial pallet).

7.PACKAGING

7.1. Packaging and packages:

Packaging can be characterized as: functional combination (connection) of the product with the package.

Package is a means (equipment) or set of means to protect the material against deterioration or loss during handling, transport, storage and direct sale. Depending on the phase of the logistics chain where the package is used, we distinguish the following packages:

- **Consumer,**
- **Distribution,**
- **Transportation.**

Handling with packaging and packages in the Czech Republic is directly regulated by **Act No. 477/2001 Coll., On packages, as amended.**

Packages functions:

- **Primary function**
 - Protective,
 - Storage,
 - Handling and transportation,
 - Information,
 - Ecological.
- **Secondary function**
 - Commercial,
 - Advertising,
 - Useful,
 - Warranty.
- **Tertiary function**

Additional - e.g., **recycling** packages and reuse.

Packages types:

- **By use:**
 - disposable,
 - reversible

- **By composition (quantity):**
 - Simple,
 - Composite,
 - Multiple

- **By destination:**
 - Consumer,
 - Distribution,
 - Transportation

8. ASSEMBLY SERVICES

8.1. Assembly services:

Assembly (derived from the term for *joining together*, also **assembling**) is a human activity that can be generally described as compilation of parts in a single resulting whole.

Basic methods of assembly in industry:

- **Assembly in piece production,**
- **Assembly in serial production,**
- **Automated assembly.**

Assembly in piece production usually takes place in a single workplace where a group of skilled workers assembles the product from the ground up. This is how custom-made devices are assembled according to individual customer requirements. They include mainly manufacturing machines, such as machine tools, power equipment or production lines for the food industry.

Assembly in serial production is most often in the form of an assembly line, where a product carried by a conveyor moves smoothly or regularly. The individual workplaces are then equipped with assembly jigs, tools and a stock of parts. Each workplace is equipped to perform specific tasks. The assembly line can be a belt that transfers small articles, typically electrical appliances, from one worker to another each attaching their component. The most sophisticated form is represented by the overhead conveyors in automobile factories, where several workers with specialized tools are moving around each car at each workplace.

Automated assembly takes place virtually without the touch of a human hand. Assembly machines are specialized lines for assembling a specific, relatively simple product in hundreds of thousands of doses. It is used for the production of, for example, light bulbs, basic wiring devices such as switches and sockets, or the production of components for the automotive industry. In this case, the operator only adds components to the tanks and takes away the finished products. A special type of assembly machines is represented by the PCB (printed circuit board) assembly lines. A blank PCB is printed with solder paste, the manipulators stack the SMD component in the correct positions and the components are soldered in the remelting furnace. The assembled and soldered board is created within one pass through the assembly line.

Assembly procedure:

- Part,
- Subassembly,
- Assembly (set),
- Product.

8.2. Assembly jigs:

They are single-purpose tools that facilitate the assembly of products. Often these are different holders or racks in which individual parts are clamped in a precisely defined position to be screwed or riveted. Other times, they allow the assembled unit to rotate so that it is easily accessible from all sides.

9. COMPLETION AND SPECIAL LOGISTICS SERVICES

9.1. Completion

Goods completion (or picking) by orders includes product regrouping in relation to the assortment and quantity required by the customer.

Classical picking technologies are based on barcodes and mobile terminals with scanners.

Modern picking technologies aim to reduce the error rate and make it easier for storekeepers to orientate in the warehouse or picking itself. The most commonly used technologies include:

- Pick-by-light,
- Pick-by-voice,
- Pick-to-belt.

Pick-by-light is a light-signalling system that increases productivity and reduces picking errors. It is suitable for small low-speed items and piece picking from unpacked packaging.

Pick-by-voice refers to a voice technology system that has helped to eliminate error rates during picking, increased productivity and process quality, reduced administrative tasks, and enabled real-time control of goods with the possibility of inventory check. This system is designed especially for retail, wholesale, logistics and distribution companies. With its functionality, it covers warehouse operations such as picking preparation, cross-docking, distribution, inventory check (continuous and annual) and goods receipt.

Pick-to-belt is a picking system for which target trolleys (crates, containers) equipped with a bulk display are intended. These trolleys are prepared and anchored to the given positions and the goods are picked into them according to the order. The display on the target trolley (container, crate) lights up and shows the quantity of items ordered. Items to be picked are transported to the stock operator one by one, e.g. using an automatic conveyor or, in the case of a two-step method, using a completion trolley.

9.2. Special logistics services:

Special services in the field of transport and logistics include:

- Distribution and storage of hazardous substances (Dangerous goods),
- Distribution and storage of perishable food,
- Railway transportation of combined trains,
- Rental of special railway wagons, containers and handling equipment,
- Repair and maintenance of transport and handling equipment.
- Customs clearance and insurance of consignments.
- And others.

10. FINANCIAL SERVICES IN THE CONTEXT OF LOGISTICS

10.1. Financial services in the context of logistics

Financial services (financial industry, financial sector) are one of branches of the services sector. They include all financial services from the field of **financial industry** which are provided by financial institutions and other entities. Their main or secondary object of activity consists in the **management of financial resources**.

The financial services of logistics services providers include in particular:

- Banking,
- Insurance,
- Reinsurance,
- Leasing and others.

Financial services in the context of logistics have the following divisions:

- **Banking services**
 - Storage of financial funds and valuable items
 - Securing (intermediation) non-cash payment transactions
 - Providing loans
 - Currency exchange services
 - Advisory and intermediary financial services
 - Processing and clearing payment and debit card transactions
- **Insurance, reinsurance**
- **Other financial activities and intermediation** (Holding activity, Financial leasing, Loan granting ...)
- **Pension funding**

10.2. Insurance services in the context of logistics

Insurance activity means the taking over of **insurance risks** on the basis of concluded **insurance contracts** and the performance of them, as well as **insurance management and liquidation of insurance claims**.

Carrier's general liability:

Whether it is railway, road, air or maritime (or inland waterway) transport, the carrier (forwarder) is usually **responsible (liable) for the loss, damage or late delivery of the shipment (consignment) from the moment of takeover to the moment of shipment delivery**.

Carrier's/freight forwarder's liability limitation

- according to the **CMR - 8.33 SDRs** (Special Drawing Rights) per 1 kg of gross weight of lost or damaged consignment as for the **road carrier**,
- according to the **Hague-Visby rules - 2 SDRs** per 1 kg of gross weight of lost or damaged consignment **or 666.67 SDRs** per unit / unit as for the shipping (maritime) carrier.
- according to the **Montreal Protocols - 19 SDRs (XDR)** per 1 kg of gross weight of lost or damaged consignment as for the **air carrier**,
- according to the **Convention on International Carriage by Rail (COTIF) - 17 SDRs (XDR)** per 1 kg of gross weight of lost or damaged consignment as for the **railway carrier**.

II. LOGISTICS CENTRES (FREIGHT VILLAGES)

II.I. Logistics objects - logistics centre and public logistics centre (freight village)

Logistics centres

Logistics centres can be characterized as **objects in which transport, logistics, forwarding, distribution and other companies operating in the logistics chain operate independently**. They associate (consolidate) transport flows and, in some cases, even different modes of freight transport, thus, facilitate cooperation among individual carriers. They are built in **places of transport nodes (hubs) and large economic concentrations**.

In practice, the term "logistics centre" is often confused with the **public logistics centre (PLC; freight village)**, however these are not interchangeable. The biggest difference consists mainly in the **way of funding**. PLCs are conceived as public and thus accessible to the broad business community, and the state is involved in their construction and cares to ensure equal access to offered services and activities.

Logistics centres divisions:

- Depending on the **range of operation** (geographical range) of LC:
 - **international**,
 - **regional**
and currently
 - **dominant**,
 - **local**
 - **sectoral**
- Depending on the connection **to transport infrastructure**:
 - **monomodal** - with connection to one mode of transport, most often road,
 - **multimodal** - at least two modes of transport infrastructure,
 - **intermodal** - with connection to at least two modes of transport while allowing for handling with intermodal transport units.
- Depending on the **function**:
 - Multimodal (intermodal),
 - Transit terminal,
 - Distribution centre,
 - Logistics services centre.

- Depending on the **purpose**:
 - Corporate,
 - Logistics centres of logistics companies,
 - Logistics areas,
 - Logistics centres of the courier, express and parcel services providers,
 - Logistics centres of internet shops.

- Depending on their **construction funding**:
 - private,
 - public.

II.2. LC services:

LCs offer **basic, supplementary** and **other** services.

Basic services include **transport** services, transport providing (acquisition), loading, unloading, reloading (transshipment) goods (cargo) and handling units, goods transportation, goods and handling (transport) units storage (warehousing), commissioning, central parking (for passenger and freight vehicles), pick-up (collection) and delivery (distribution).

Conception (elements) of LC:

- large-capacity storage premises,
- cross-docking warehouses
- transshipment points (terminals),
- administrative and financial buildings
- transport infrastructure
- packaging lines
- the possibility of renting transport and handling equipment,
- assembly plants for final assembly,
- fuel stations,
- restaurants,
- service and social facilities, etc.

12. INTERMODAL TRANSPORT TERMINALS

12.1. Basic terms

Multimodal transport is the transportation of cargo by two or more modes of transport.

Intermodal transport is the relocation (transportation) of cargo in one and the same transport unit or on a road vehicle while using sequentially two or more modes of transport without handling with the cargo when changing the mode of transport.

Combined transport (transportation) is a specific type of intermodal transport where the major part of the journey is performed by railway, inland waterway or maritime transport and each initial and final part (section) of the journey, performed by road transport, is as short as possible.

Combined transport operator is a legal or natural person who, in its own name or through another person acting in his interest, concludes a combined transport contract, issues a single transport document and assumes responsibility for himself.

Container is a general term for a freight box - the **TEU** is the equivalent of a transport unit of the size of a twenty-foot container (20').

12.2. Intermodal terminal

Intermodal terminal (or intermodal transport terminal) can be characterized as a specially constructed and equipped area where, using transshipping systems (handling equipment), it is possible to transload (reload) the transport unit of the individual transport systems within intermodal transport.

Conception and basic elements of intermodal terminals:

- Road input infrastructure,
- Internal road network,
- Storage and stacking areas,
- Handling equipment,
- Reloading, handling and stacking railway tracks,
- Connecting railway tracks of a terminal with railway network,
- Repair and service facilities (workshop),
- Administrative areas.

Railway lines and connection of the transshipment area: for intermodal terminal within the Czech Republic, the most important railway lines are listed in the **AGTC Agreement - European Agreement on Important International Combined Transport Lines and Related Installations.**

Framework requirements for an intermodal terminal meeting the criteria of the AGTC agreement:

- Length of **railway tracks for loading and unloading:** 750 m,
- Wharf length: min. 110 m,
- **Handling equipment** capable of handling any standard and established intermodal transport unit,
- 100 percent **backup** of handling equipment,
- **Handling equipment load capacity** - 40 to 42 tons on hanging equipment,
- The terminal **capacity** is set so that a combined train (600 to 750 m) can be processed within **1 hour**, and road freight delivery trucks do not wait for more than **20 minutes**.

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