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## Learning Objectives

As the field of logistics has undergone rapid developments both in scientific research and commercial practice, a multitude of new contents, point of views, and terminologies exists. The key aspects are explained in this chapter. The focus is on the development which has seen the transition of logistics from being perceived in a purely functional way to the modern view of management-oriented, holistic supply chain management. Subsequently, the individual levels of logistics, the involved agents, institutions and their key activities will be discussed. In this way, the readers are introduced to logistic actions and decisions, enabling them to identify with logistical issues by applying the most current understanding of logistics.

## Keywords

- Basic definitions of logistics
- Significance of logistics in the context of general business administration
- Classification and differentiation of logistics in the economic process
- The logistical system of performance with its components and key activities
- Agents and key elements of logistics in the national economic context
- Distinction between the terms procurement logistics, production logistics, and distribution logistics, and their basic decision fields
- Delivery policy as the basis for cost and price calculation

## 2.1 Definitions and Significance of Logistics

In a world which increasingly relies on the division of labor and fragmentation of work flows, goods and commodities need to be transported from their place of origin to their place of consumption or place of use. The span time between the production and the utilization of goods has to be bridged. This is also true for both the people and the information involved in the fragmented work flow and which are available in different locations and at different times within the system. The tasks and activities associated with this within the economic process were first systematically subsumed under the term *logistics* in mid-twentieth century. Initially, the term emerged in a military context since military systems are characterized by their tendency for concised classification.

The European Committee for Standardization CEN (Comité Européen Normalisation) defines logistics as<sup>1</sup>:

- "... the planning, execution and control
- Of the movement and placement of people and/or goods and
- Of the supporting activities related to such movement and placement, within an system organized to achieve specific objectives."

Here, the term *system* is to be understood as a dynamic unit of interconnected elements and subsystems, connected with each other in specific relations. These elements and subsystems form the system structure and – by virtue of their interaction with each other – result in the system behavior. The defining characteristic of a system is its orderliness.<sup>2</sup>

The purpose of logistics is to plan, organize, coordinate, and implement the bridging of the dimensions of time and space within a system. Logistics is thus one of the most important functions of the economy. This ranges from the procurement of raw materials to their processing and to the delivery of the goods to the end-user.

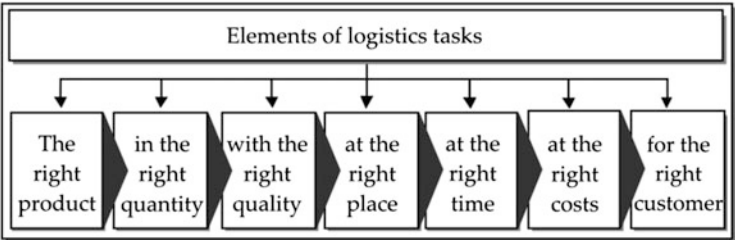
The central tasks of logistics can be graphically described by the so-called *seven R's*, as depicted in Fig. 2.1. There are not any clear-cut definitions as to what constitutes *right*. The *right* thing to do always individually results from the particular elements involved in the logistical task, i.e. from the products, the quantity, the spatial relations, the customer requirements etc.

In the course of the development of modern business studies, the notion of logistics in the context of the production and distribution of goods has changed significantly since its emergence in the mid-1950s. In 1955, the article *Note on the Formulation of the Theory on Logistics* by Morgenstern was published, in which logistical approaches were transferred from military contexts to the field of business studies for the first time.<sup>3</sup> As time went on, logistics developed from serving a simple, unidimensional operational support function to being a networked,

<sup>1</sup> European Logistics Association (ELA) (2005), p. 54.

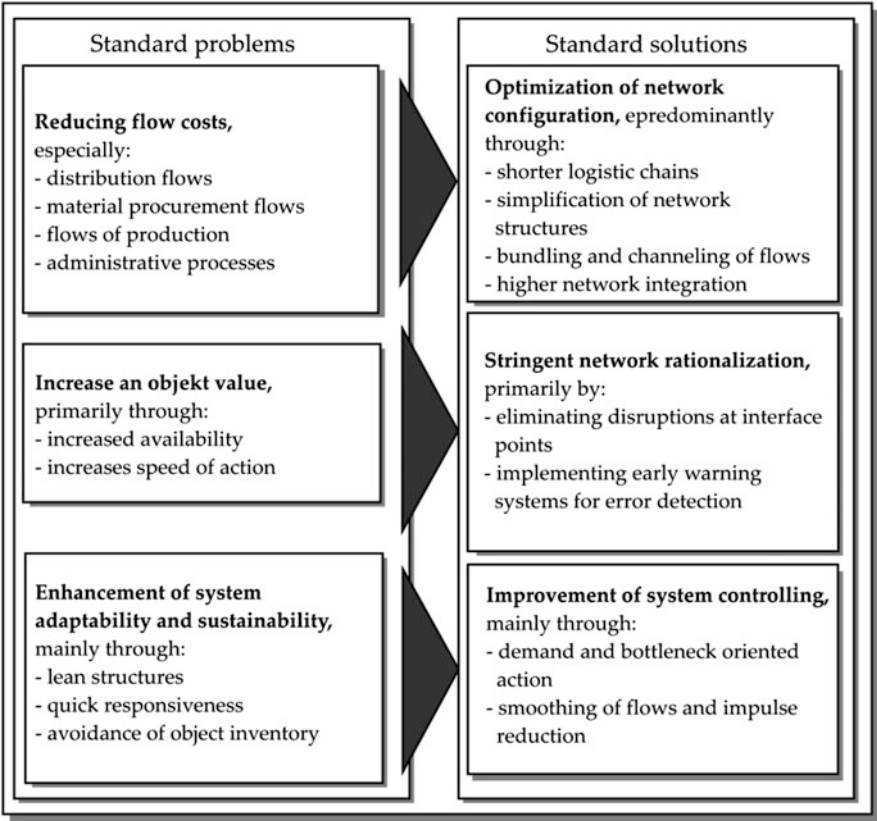
<sup>2</sup> Cf. Greschner (1996), p. 9 and Jirasek (1977), p. 17 et seq.

<sup>3</sup> Cf. Morgenstern (1955), p. 129 et seq.



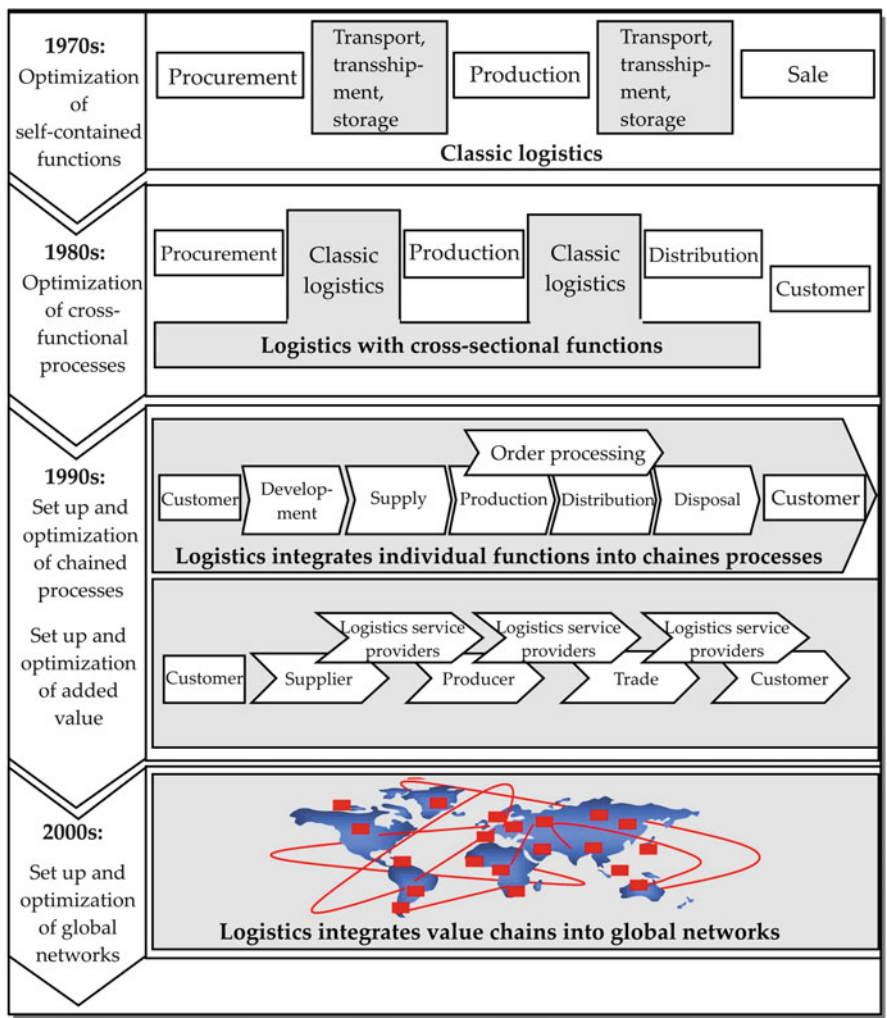
**Fig. 2.1** Elements of logistics tasks  
(Cf. Klaus 2002, p. 11; Pfohl 1972, p. 28 et seq.; Jünemann 1989, p. 18)

multidimensional process that spans all value-added steps and aims to optimize holistic and complex operational and economic activities. This change of logistical understanding now comprises the entire sequence of activities depicted in Fig. 2.1,



**Fig. 2.2** Logistical problems and solutions (Cf. Klaus 2002, p. 30)

which includes the actual transport of goods from their origin to the consumer or end-user. Klaus offers his scientific theory of the *third meaning of logistics* (*Die dritte Bedeutung der Logistik*), which discusses this development and the modern logistical understanding of Flow Management – an understanding of logistics that has become necessary in today’s globalized economy which is based on the division of labor. Flow Management conceptualizes the management of continually moving flow systems and defines logistics as an economic phenomenon comprising activities and processes in chains and networks in order to transform goods and



**Fig. 2.3** Changes in the understanding of logistics (Cf. Baumgarten and Walter 2000, p. 2)

the information pertinent to them.<sup>4</sup> According to this practice-oriented explanation, logistics is characterized by the following operational goal clusters:

- Cost reduction of the logistics process in particular and of the total process in general
- Increase of the adaptability of the logistics system to changes in demand and environment
- Value enhancement of the logistical objects (goods) through or during the logistics process

By assigning properties to logistics that increase the value of the goods, many courses of action open up for logistics in a macroeconomic context. Thus, modern business management understands logistics as a performance component which is relevant for success. The identified goal clusters can also be seen as standard problems of the logistical task accomplishment. The following possible solutions to these problems can be offered (see Fig. 2.2).

The change in the understanding of logistics over time is illustrated in Fig. 2.3. It proceeds from the original, rather simplistic view of *transporting, handling, warehousing* with its emphasis on the physical aspect of the logistical task and moves on to the current, management-oriented view of integrated value chains.

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## 2.2 Logistical System of Services

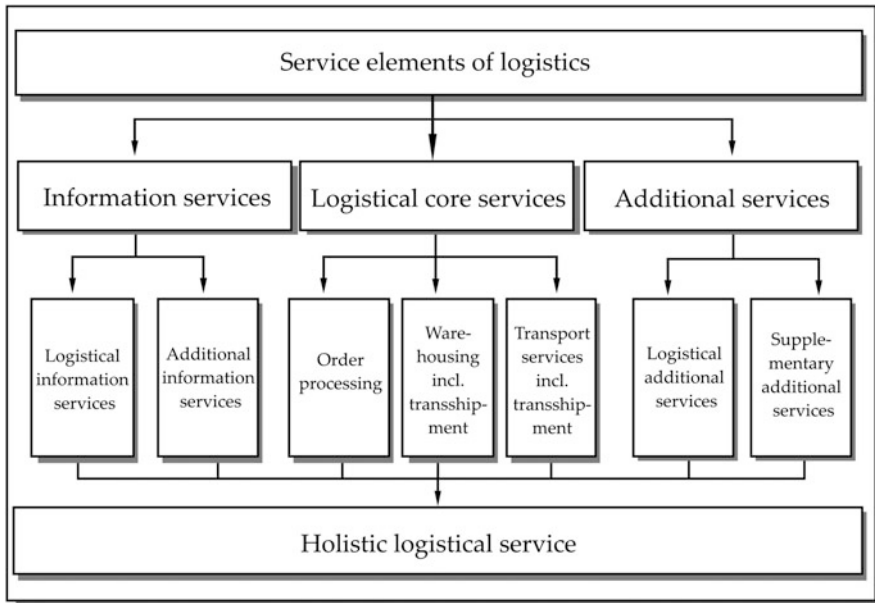
Based on the preceding chapter's definitions of logistics, the services that logistics renders will be more specifically defined in the following.

The logistical system of services features a wide range of system components, which are illustrated in Fig. 2.4. The *core services* of logistics, such as order processing, storage and transport, are directly supported by the logistical information services and the additional services necessary for the logistics process. In practice, the element of transshipment is rarely dealt with separately since it is usually closely connected to storage and transport. The core element of *order processing* is somewhat virtual in nature but constitutes an indispensable element for the initiation and monitoring of logistics processes. It is the order processing which gives logistics its dynamic character. Order processing comprises the processing and monitoring of the order data from the time of order until the arrival of the goods at the customer's site and of the return of the shipment documents. In many cases this includes the initiation of invoicing processes, e.g. by simultaneously delivering the invoice together with the goods.

The core element of *storage* denotes the warehousing of goods, which have mostly been produced for an anonymous market to offset the quantitative and chronological divergence of production (supply) and sales (demand). It has to be noted at this point that the functions of picking and packing, which are closely

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<sup>4</sup> Cf. Klaus (2002), p. 26 et seq.



**Fig. 2.4** System of logistical services (Cf. Isermann 1994, p. 25)

connected to the core element of storage, fall into the category of additional services. Picking means the compilation of sellable articles according to individual customer orders to form package and shipping units.

Finally, the core function of *transport* bridges the spatial distance from the site of production to the storage location to the delivery location at the customer's site. Thus, it offsets the spatial divergence of supply and demand. Again it has to be pointed out that both storage and transport include the function of transshipment.

*Logistical information services* produce and utilize data about the goods being transported within the logistics system. This data includes information about the forwarder, the recipient, the type of goods, order number, quantity, weight, volume etc. The logistical information is the key to planning, monitoring, and supervising in the provision of the actual logistics service. A data-driven logistical activity closely connected to the core service of storage is the inventory management (see Chap. 7). The volume of inventory normally has a direct but often underestimated influence on the financial situation of the company, resulting from the cost of capital commitment incurred by the volume of inventory (see Sect. 10.2).

Additional services of logistics include, for instance, picking, palletizing of goods for economical shipping (easier loading and transport), additional packaging for protection, identification and easier handling of goods and commodities, repackaging of goods from bulk packaging into smaller package units etc.

*Supplementary information services and additional services* can usually be incorporated into the logistical core process without expanding further organizational effort. In this way, substantial additional value can occasionally be created for the contractor of the logistical service. Additional information services may, for

example, refer to additional information about the goods such as prices, quantity discounts, and cash discounts. They may also refer to obvious facts regarding the customer's commercial situation or, for instance, regarding the number of residents, size of the backyard or location of the private property.

Information of this kind can later be analyzed for marketing purposes. Additional services also comprise promotional or advertising packaging of goods. Additional services can be rendered at any given location, i.e. not only at the forwarder's site but also, as it is often the case in the automobile sector, directly at the contractor's site or at a third-party site in transit of the goods between origin and destination.

The ensuing case studies aim to illustrate the logistical system of services.

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### **Case Study 2.1: Motor Scooter Assembly**

The forwarding agency *Wackler* has been commissioned with the logistic operations of a DIY superstore chain. *Wackler* provides its client with additional services. They import motor scooters from a Chinese manufacturer for the DIY superstore chain. The content of the shipment is communicated to Germany via data transmission upon dispatch at the port in Hong Kong [*logistical information service*]. The motor scooters are disassembled into their components, then shipped to the port of Rotterdam and subsequently taken by truck to the *Wackler* location in Göppingen [*logistical core service*]. First, the boxes containing the components are stored there [*logistical core service*] before they are successively assembled by a specially formed and trained team of *Wackler* employees [*additional service*]. Having been technically inspected and certified by the TÜV (German Association for Technical Inspection), the motor scooters are packed for transport [*additional service*] and sent to the individual DIY stores [*logistical core service*].

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### **Case Study 2.2: Module Assembly**

BMG (a module assembly company) is a fully owned subsidiary of the logistics provider Schnellecke. BMG has been entrusted by Volkswagen Braunschweig with the assembly of the modules *Subframe* and *Cornermodule*, pertaining to the car models Golf and Passat, for Volkswagen Sachsen Ltd. in Zwickau [*additional service*]. The service provider is also responsible for the disposition and storage of the primary material [*logistical core service*] and for the delivery of the assembled modules to the assembly line [*logistical core service*]. The assembly and delivery for each particular production sequence is carried out according to the logistics planning of Volkswagen Sachsen Ltd.

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### **Case Study 2.3: Price Tags and Textile Finishing**

Apart from logistical core services (administrative transaction, storage, handling, transport), the logistics service provider Thiel Fashion Lifestyle (TFL) offers a broad spectrum of additional fashion services in the field of textile procurement,

production and distribution logistics. This includes, for instance, all types of picking, price tagging, labeling, and textile finishing.

Upon pickup at the production site (e.g. in Middle Eastern Europe), TFL forwards the finished goods of its clients Hugo Boss and Gery Weber to its logistics center in Macedonia [*logistical core service*]. The client conveys all information relating to the order to TFL beforehand via remote data transmission (RDT). TFL then logistically processes this information [*logistical information service*]. Among the additional services is the finishing of the hanging garments. Specially trained staff members check the quality of the textiles. Subsequently, the garments are finished using a tunnel finishing system. First, the hanging garments are dampened, then stretched and finally dried. After the textiles have been finished and are ready for sale, they are packed into special hanging cartons, which is to ensure crease-free and undamaged transport of the goods [*additional service*].

Another additional service offered by TFL is the labeling of the goods. Besides price tags, TFL additionally fits the garments with anti-theft tags. Depending on the customer requirements, the order-related picking is followed either by the storage of the goods, the transport to the customer's central warehouse, or the transport to the point of sale by means of TFL's comprehensive European network [*logistical core service*].

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## 2.3 Agents and Elements of Logistics

The business performance within logistics networks is determined by various agents, processes, and not at least by the different kinds of goods. The agents, available means of labor, and different kinds of goods constitute a frame of action within which the logistical processes are affected.

The now all-encompassing process of the transformation of goods from the source to the drain can also be described in national economic terms. Referring to the different aggregate levels in economics, a distinction has to be drawn between macrologistics, micrologistics, and – deriving from these two – metalogistics (see Fig. 2.5).

*Macrologistics* on the one hand describes the traffic system and, on the other hand, the suitable infrastructure for the logistical core functions of warehousing and transshipment. Thus, macrologistics represents the macroeconomic perspective.

*Micrologistics* describes microeconomic systems with logistical functions which in most cases are characterized by the respective sector. From a shipping agent's viewpoint, industrial logistics is different from retail logistics in that they each cater their logistical performance to varying time standards and to the respective differences in the shipper's and recipient's supply and demand behavior. The logistical service is a secondary service for the consignor, i.e. it is not the company's main purpose.

In service logistics, the logistical operation is a primary service, i.e. the actual object of the company. Depending on the kind of services provided by the respective companies, we can distinguish between carriers, logistics service providers in the narrow sense (forwarders, shipping companies etc.), and infrastructure



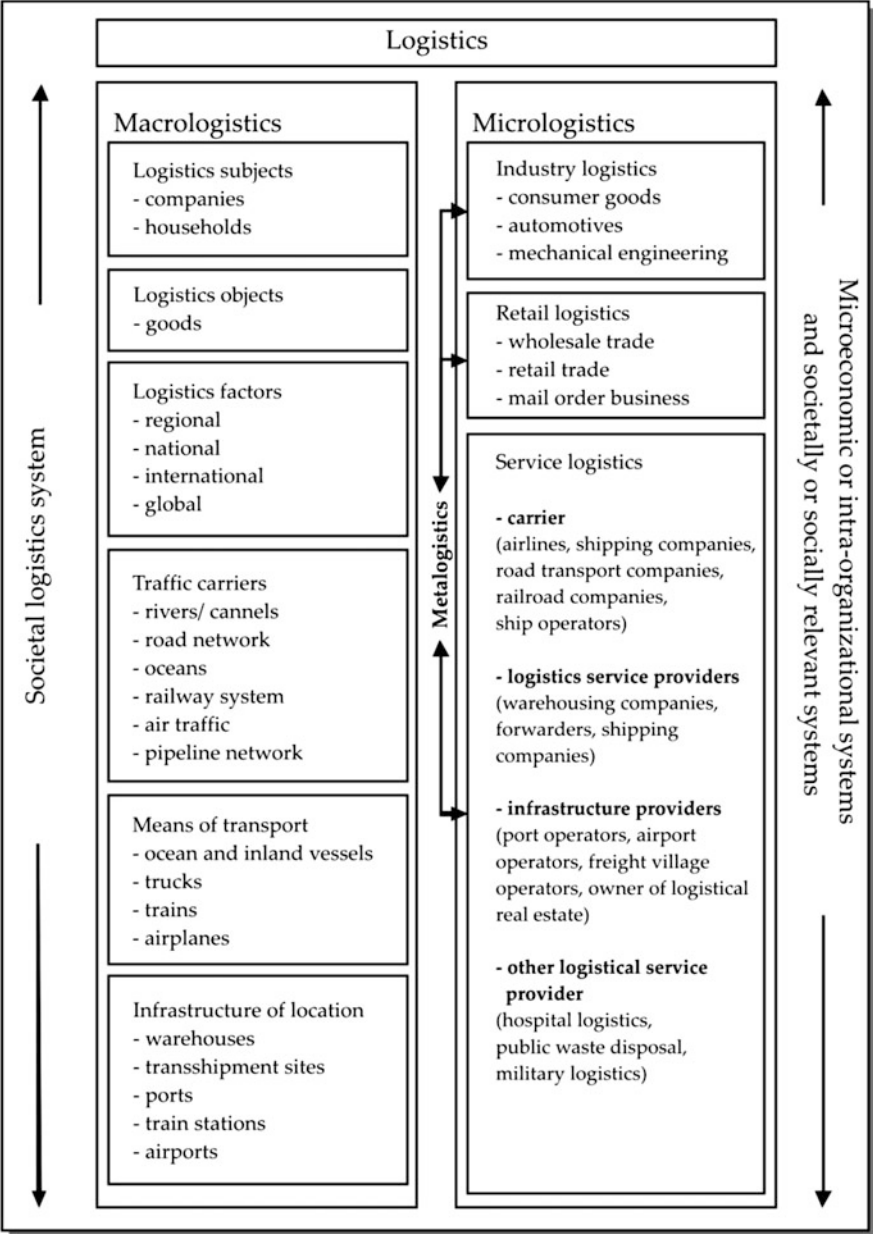


Fig. 2.5 Elements of logistics (Cf. Pfohl 1990, p. 14 and Ihde 2001, p. 134 et seq)

providers (warehousing service providers). Furthermore, societal or social systems such as hospital logistics or public waste disposal can be subsumed under the term micrologistics.

*Metalogistics* describes every kind of institutional or functional cooperation between independent organizations within micrologistics in order to enable logistical performance. These cooperations may be established, for instance, between industrial and commercial companies to facilitate the joint organization of warehousing and the supply of final customers, between logistics service providers to build up a nation-wide distribution network covering all regions, or between different traffic carriers (railway, inland vessel, road, air traffic).<sup>5</sup>

Thus, logistical processes can always be categorized according to individual elements pertinent to the systematization components of macrologistics, metalogistics, and micrologistics.

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## 2.4 Distinction between Procurement Logistics, Production Logistics and Distribution Logistics

Following the functional distinctions of logistics and the transport and sector-specific categorization of logistics, we shall now consider the functional distinctions of logistics systems according to the phases of the flow of goods. This ranges from the supply of goods to the disposal or recycling of waste. The range of these functions, with reference to conventional producers, is depicted in Fig. 2.6.

As it is the case in many areas of operational organization, the distinction between the tasks and their definitions as well as the assignment of functions (order processing, warehousing, transport) to certain forms of organization (inventory management, procurement logistics, production logistics, distribution logistics, or logistics) is very difficult and only possible in highly general terms. In operational practice, the individual functions are diversely assigned within the organizational structures of the companies.

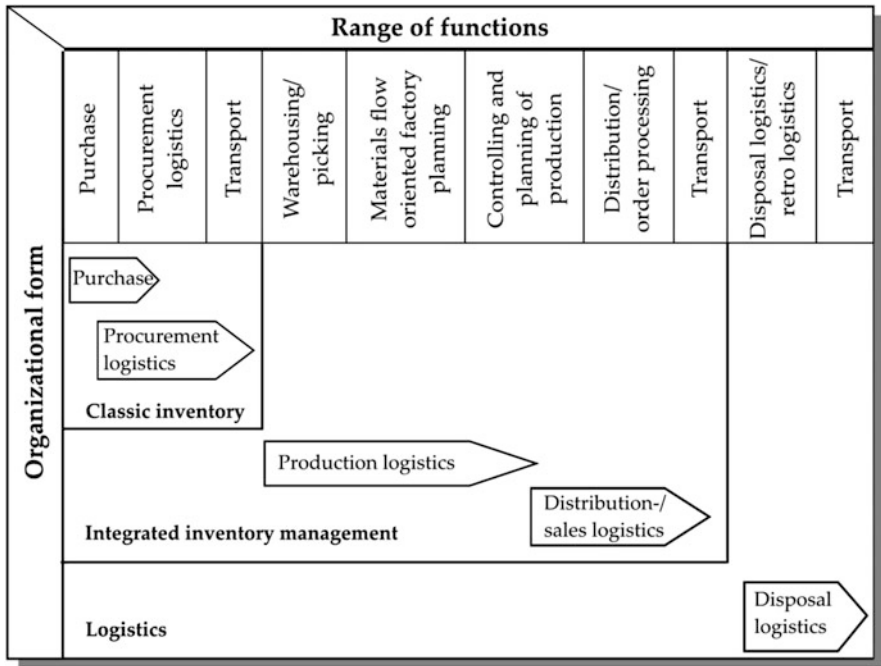
The basic task areas of business enterprise are shown in detail in Fig. 2.7.

*Procurement logistics* is concerned with the organization and the physical processes involved in the transport and supply of the input factors for the corporate process. This applies both to industrial companies and trading companies.

The procurement process aims to ensure the economic supply of the materials or commodities which are to be processed. In practice, the purchase with its market-oriented and contracting tasks is either subsumed under the term procurement (see Fig. 2.7) or is given its own business function. Manufacturing companies often refer to this phase in the flow of goods as materials management (see Fig. 2.6). However,

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<sup>5</sup> Cf. Pfohl (2010), p. 14 et seq.



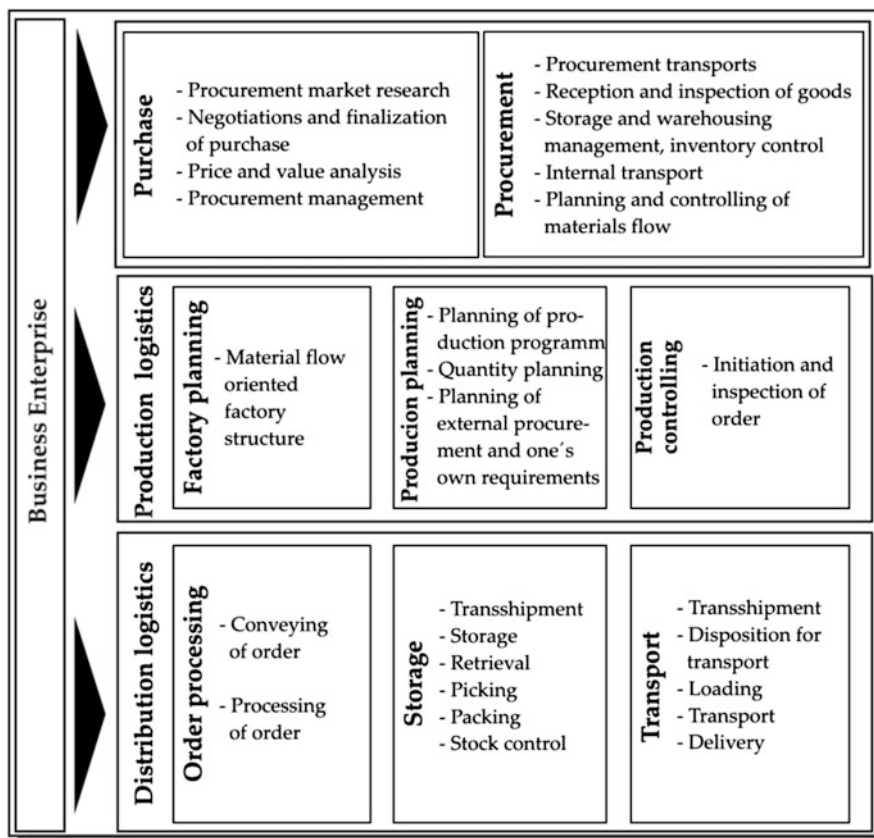
**Fig. 2.6** Functional distinctions of logistics (Cf. Schulte 2009, p. 2)

materials management may also include production and distribution. Due to this ambiguity, we shall avoid the term materials management.

*Production logistics* is mainly associated with manufacturing companies. It deals with all tasks pertinent to the planning and controlling of those internal processes that relate to the materials flow, storage, and internal transport. Additionally, production logistics plays an important part in planning and integrating both the preceding procurement logistical processes and the subsequent distribution logistical processes. If there is a high degree of integration as a result of a flow or network-oriented understanding of logistics, production logistics may be integrated into the logistics network as an immediate link. Thus, IT systems are able to receive direct input from inventory control systems for the planning and controlling of production programs (see Sect. 9.3).<sup>6</sup> Production logistics is less characterized by major physical flows of goods over long distances rather than by intelligent planning of the processes and the provision of goods within a smaller context. This is why it can also be understood as a special field of production.

*Distribution logistics* is primarily concerned with the coordination of all processes that serve to deliver the goods to the recipient or to the point of sale for consumption by the end user. Distribution logistics describes the interaction of

<sup>6</sup> Cf. Vahrenkamp (2008), p. 88 et seq.

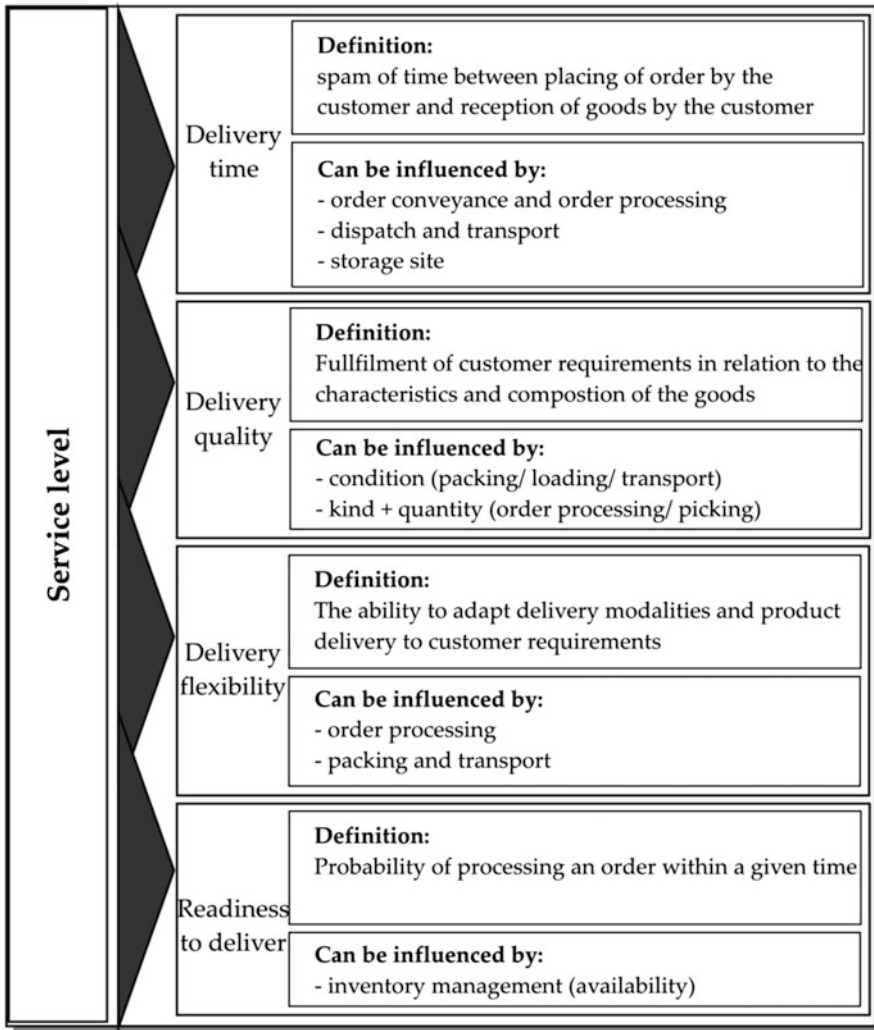


**Fig. 2.7** Differentiation of business enterprise (Cf. Schulte 2009, p. 267)

transport and storage processes within logistics systems for the distribution of a company's goods. Since the distribution process includes all elements of the logistical performance spectrum in a variety of ways (see Fig. 2.4), it will be given special emphasis in the following.

## 2.5 Service Level

The elements of logistical business performance were outlined in Sect. 2.2. In order to determine the extent and quality of business performance, we need to define a service level. An operationalized service level allows for the measurability of the service provided and also serves as a basis for the cost and price calculation. The individual determinants of the service level are illustrated in Fig. 2.8.



**Fig. 2.8** Determinants of the logistical service level (Cf. Pfohl 1972, p. 177 et seq)

The service level is not an arbitrary variable. It should be defined as part of a logistical service offer for a specific group of goods and clients.

The service level and the features of the delivery service are not solely determined by customer requirements. Factors such as service levels of competitors, capabilities of the company including earning power (contribution margin) of the objects (goods and commodities), and the extent of the value to be added by logistics should also be taken into consideration. A further distinction has to be drawn between regular service and emergency service.

In many cases, however, the service level is determined by the goods themselves. A prime example of this is food logistics, where commodities need to be moved quickly within the logistics networks so that they reach the final customer fresh.

### Case Study 2.4: Service Level Components in Mail Order Business

Many mail order companies offer their customers a diversified delivery service. The regular delivery time is 2–3 working days. This case study shows one typical delivery service of a full range assortment mail order company offered on the German market.



Other additional offers tailored to customer requirements affect the delivery time and flexibility. In their catalog and on their webpage, the example company labeled their individual service offers with the symbols next to the text on this page. As regards the delivery time they offer a *24 h delivery service*.

From Monday to Thursday, they guarantee next day delivery if the customer orders by 12 noon. If the order is placed by 12 noon on a Friday, delivery will be effected the following Monday. Orders which are placed between Friday 12 noon and Sunday inclusively are delivered on Tuesday. This applies to articles that are delivered in postal parcels. Similar conditions apply for bulky articles, such as fridges or TV sets, which are delivered by forwarding agencies.

Furthermore, the mail order company offers an *evening delivery service* in many ZIP-code areas, which guarantees the delivery of major articles by a forwarder from Monday to Friday between 5 pm and 9 pm if the customer orders by phone or online [delivery time and flexibility].



For many articles the customer may state a *preferred delivery day*. Depending on the article, delivery is then effected from the 3rd or 5th day onwards after placing the order online or on the phone.



A preferred delivery day between Monday and Friday may be stipulated for articles which are sent by mail. It is not possible, however, to request a certain time for the delivery [delivery time and flexibility].

Neckermann also offers a disposal new device or furniture has been request the disposal of the old device upon delivery [flexible delivery].



and assembly service. If a ordered, the customer may or furniture by Neckermann



The delivery of tumble dryers, washing machines, dishwashers, fridges, and freezers includes unpacking, removal of lock fasteners, and installation. Furniture may be assembled on request.

By means of checks during picking and before the packing of customer parcels and by using padding material, a high standard of delivery quality is ensured. Articles which are delivered by forwarders receive special

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repackaging to protect them from damage [delivery features]. In this case, delivery to the customer is ensured by a pre-announcement via telephone (advising). The availability of the articles [readiness to deliver] is maximized by issuing test catalogs prior to the publication of a new catalog, timely observation of customers' ordering behavior during a particular catalog season, and evaluating the ordering behavior of previous catalog seasons.

### Review Questions

1. What kind of problems does logistics deal with?
2. Describe the development of the understanding of logistics up to Klaus' *third meaning of logistics*.
3. Describe the *7-r-approach* of the modern understanding of logistics.
4. Distinguish between macrologistics and micrologistics.
5. Give a concrete example for each element of metalogistics and explain its connection to macrologistics or micrologistics, respectively.
6. Distinguish between procurement logistics, production logistics, and distribution logistics.
7. What are *agents* in logistics? Give examples.
8. What may influence each element of the service level?
9. How can the right service level for a product or company be found?
10. What is the difference between inventory management and procurement logistics?

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Basics — Exercises — Case Studies

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