

Kurt Matyas

Maintenance Logistics

Enhancing Quality and Productivity

HANSER

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Preface to the First Edition

I am very pleased that Maintenance Logistics is now available in an English edition for the first time. The content of this edition corresponds to the ninth German edition of the book, which builds on more than 25 years of development since the first edition was published in 1999. The continuing interest in the subject confirms my conviction that the core ideas of maintenance logistics – improving quality, securing productivity, and enabling innovation – have not lost any of their relevance. On the contrary, they have become even more important.

Recent years have once again illustrated how strongly geopolitical and societal developments influence industry. Following the COVID-19 pandemic, supply chain crises, geopolitical tensions – in particular due to the war in Ukraine – as well as the consequences of the energy and climate crisis continue to shape economic reality. At the same time, pressure on companies to align competitiveness and resilience with the goals of sustainability and the Sustainable Development Goals (SDGs) is growing.

Against this backdrop, key thematic areas have been expanded and updated in this 9th edition:

- New scientific findings in the fields of industrial data science and artificial intelligence (AI), which today represent practical tools for forecasting, optimization, and decision support in maintenance
- The integration of the concept of the Physical Internet into logistics, which combines efficiency gains with resource conservation and thus offers not only economic but also ecological benefits
- The presentation of current standards in quality and maintenance management, including the latest versions of the ISO 9000 series and the EFQM model

Modern maintenance logistics is therefore not limited to reducing costs and increasing technical availability. It also has to contribute to decarbonisation, circular economy, and the sustainable transformation of industrial systems.

The target audiences remain, as before, maintenance managers, specialists and executives in industry, as well as students in technical and business-related fields of study. This book aims to provide them with both concrete methods, tools, and checklists, as well as a scientifically grounded overview of the interrelationships between maintenance, logistics, and quality management.

My sincere thanks go to my colleagues in the research team, whose projects and cooperation with industrial partners have made important contributions to this edition. I would particularly like to thank Professor Fazel Ansari, Theresa Madreiter, and Andreas Steiner for contributing their latest research findings and practical experience to the respective chapters.

Finally, as in all previous editions, my deepest gratitude goes to the most important people in my life: my wife Sabina, who has given me strength, inspiration, and support for many years, and my daughters Nina and Marie.

Vienna, July 2026

Kurt Matyas

1

Logistics

1.1 Definition and History

The term logistics has its origins in French (loger, "to accommodate", "to lodge") and was used from around 1830 initially in a military context to describe the planning and implementation of supply, transport, and provisioning operations [165]. As early as the 18th and 19th centuries, the military developed from this the practice of efficiently supplying troops with resources [67]. This historical function forms the core of what logistics represents even today: the reliable, economical, and timely provision of resources.

With industrialization and particularly in the 20th century, the focus of logistics shifted to supplying industrial production processes. The term business logistics was coined in the 1950s in the USA and initially referred to transport, warehousing, and handling activities. Since the 1970s, it has also been used in German-speaking countries [165]. In the decades that followed, logistics increasingly developed into a strategic competitive factor with a comprehensive control function along the entire value chain – including maintenance processes that make a decisive contribution to the availability and efficiency of technical systems [77].

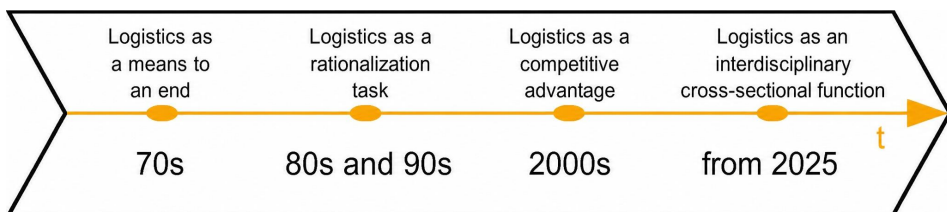


Figure 1.1 Key areas of European logistics development (based on [53])

In Figure 1.1, the chronological development of the key areas of European logistics is shown. As recently as the 1970s, logistics was regarded with little attention as a necessary means to the end of selling goods. The increasing pressure for rationalization

over time revealed a high optimization potential in the logistics sector during the 1980s and 1990s, which was often relatively easy to implement, such as reducing inventory levels. The trend toward outsourcing transport and warehousing activities also began during this period and is today state of the art. Growing competition in the market as well as rising customer requirements brought with them the search for ways to differentiate from competitors. This led, among other things, to the development of innovative logistics systems in the 2000s [28].

1.2 Logistics as an Interdisciplinary Cross-Sectional Function and Key Factor for Sustainable Development

Today, logistics is an interdisciplinary cross-sectional function that integrates, coordinates, and optimizes material and information flows – from raw materials to the return of end-of-life components in the sense of a sustainable circular economy. Its contribution to corporate performance extends far beyond the operational level and increasingly encompasses digital, ecological, and network-based aspects [163]. The potential of a holistically integrated logistics system becomes particularly evident in its interaction with maintenance.

Economic development today is characterized by high dynamics, uncertainty, and increasing complexity. Global value creation networks lead to intensified competition, but also to new forms of international cooperation. Companies are confronted with shortened innovation cycles, rising quality requirements, and a growing demand for individualized, fast, and at the same time sustainable service delivery. Added to this are volatile markets and increasing cost pressure, which affect virtually all areas of business.

Under these conditions, organizational excellence, flexibility, and continuous capacity for innovation are gaining decisive importance. Companies are increasingly orienting themselves toward the principle of seamless flows that encompass not only material and goods streams, but also information, financial, and energy flows as well as their ecological and social implications. The goal is to design efficient, transparent, and resource-conserving processes that avoid unnecessary friction losses and enable sustainable value creation.

This is accompanied by a paradigm shift from a function-oriented to a process-oriented management and organizational understanding. Logistics is no longer understood as a purely operational support function, but as an interdisciplinary cross-sectional function that integrates value creation processes end-to-end. By overcoming departmental boundaries, it contributes to the synchronization of processes, the enhancement

of responsiveness, and the strengthening of companies' capacity for innovation and transformation.

In this role, logistics becomes a key factor for sustainable development: it combines efficiency gains with ecological responsibility, creates transparency for consumers and society, and forms an essential foundation for resilient, future-viable value creation systems. In doing so, it not only contributes to the competitiveness of individual companies, but also makes a systemic contribution to the transformation toward a just and sustainable economy.

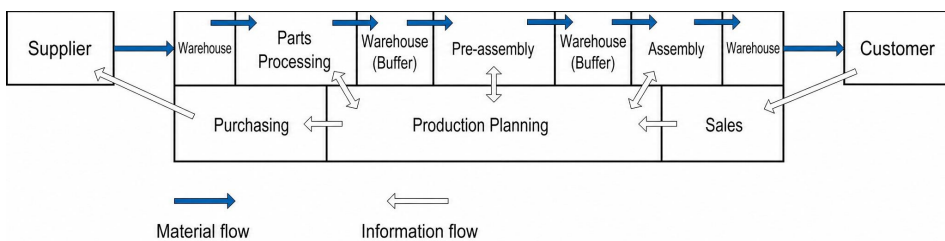


Figure 1.2 Value chain [58]

Figure 1.2 shows the principal flows of material and information through a production facility. The value creation process or value chain is understood as the operational delivery of performance encompassing all functions from procurement through development, production planning, and manufacturing to sales.

In an integrated and controlled flow system, the transport, handling, production, assembly, inspection, storage, and handling operations of all materials and goods are to be managed and coordinated from the first supplier through the facility and between facilities to the final customer.

In terms of the concept, the former designation **"material flow"** (VDI 3300: "... the linking of all processes involved in the extraction, processing, and distribution of physical goods within defined areas.") has been extended to include its control – the so-called **"information flow"**.



Definition of logistics

"Logistics is the design of the flow of objects and information from a holistic perspective with the aim of achieving an economic optimum within logistics systems. Logistics is interdisciplinary and primarily a planning activity."

In recent years, logistics has also increasingly established itself as a key factor for sustainable development. In view of global resource constraints, growing ecological requirements, and societal expectations, the logistics function plays a central role in the implementation of circular economy concepts. This concerns not only the return of products at the end of their life cycle, but also the optimization of resource utilization

along the entire supply chain – through intelligent demand planning, low-emission transport concepts, and the integration of repair, reuse, and recycling processes.

1.3 The Circular Economy in the Interplay of Logistics and Maintenance

The circular economy aims to keep resources in the economic cycle for as long as possible and to preserve their value. Logistics and maintenance play a central role in this: while logistics is responsible for managing material, information, and return flows, maintenance ensures that products and assets can be used for longer through servicing, repair, and spare parts supply.

Through this close integration, not only can costs be reduced and resources conserved, but ecological and societal requirements can also be met. Logistics enables the efficient return of used products and materials, while maintenance supports their reuse and thus creates the foundation for recycling and remanufacturing processes. Together, both functions make a decisive contribution to the transformation toward sustainable, resilient, and future-viable value creation systems.

As Table 1.1 shows, in recent years logistics has evolved from a purely operational function focused on cost and time efficiency into an interdisciplinary key discipline that integrates digital technologies and makes an active contribution to sustainable transformation [cf. 163].

Table 1.1 Core Tasks of Logistics – Classical vs. Sustainably-Digitally Extended

Dimension	Classical logistics	Sustainable-digital logistics
Objective	Cost and time efficiency, ensuring availability	Sustainable value creation, resilience, transparency, and competitiveness
Flow orientation	Material and goods flows	Integrated material, information, energy, and financial flows
Planning & control	Functionally aligned, mostly department-based	End-to-end process-oriented, networked, and collaborative
Technologies	IT systems for inventory and transport management	Digital twins, AI-supported forecasting, IoT, physical internet
Sustainability	Secondary, mostly regarded as a cost driver	Core requirement: circular economy, resource efficiency, CO ₂ reduction

Dimension	Classical logistics	Sustainable-digital logistics
Role in the company	Operative support function	Interdisciplinary cross-sectional and design function
Value contribution	Efficiency improvement and cost reduction	Systemic contribution to transformation, innovation, and sustainable development

Table 1.1 illustrates how logistics is transforming from a classical support function into a strategic design discipline that enables not only efficiency, but also sustainability, resilience, and competitiveness on a global scale.

New synergies emerge particularly in interaction with maintenance: through predictive maintenance and optimized spare parts supply, the service life of machines can be extended, resources conserved, and environmental impact reduced.

1.4 Functional Areas of Logistics

Logistics should not be understood merely as an internal service function, but as a fundamental function of corporate organization with routine tasks:

- Logistics is an instrument for ensuring, managing, and controlling the flexibility of corporate productivity demanded by the market.
- Logistics encompasses the optimal planning, management, and control of all storage and transport processes and thus includes the optimal design of all value flows (material, information, energy, and auxiliary resource flows) to, within, and from the company.

Logistics is essentially divided into the **functional/task areas**

- Procurement logistics,
- Production logistics,
- Distribution logistics,
- Disposal logistics, and
- Transport logistics.

In a supporting role, **warehouse logistics** and **materials management** are further essential functions in logistics (Figure 1.3).

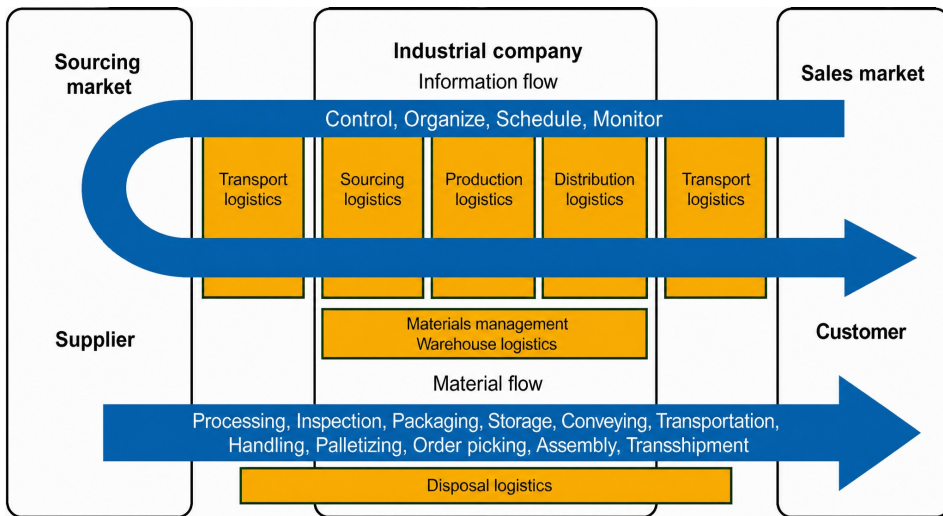


Figure 1.3 Functional areas of logistics [82]

- The **procurement logistics** encompasses the complex planning, management, and physical handling of the flow of materials and purchased parts from suppliers through to provision for production, including the necessary information flows, with the aim of accelerating flows and minimizing expenditure for the entire procurement process.
- The **production logistics** encompasses the complex planning and management of production¹⁾, internal transport, handling, and intermediate storage processes, including the necessary information processes, with the aim of accelerating flows and minimizing expenditure for the production process.
- The **distribution logistics** encompasses the complex planning, control, and physical handling of the flow of finished goods/products from the acceptance of goods from production to the customer, including the necessary information flows, with the aim of accelerating flows and minimizing expenditures for the entire distribution process.
- The **disposal logistics** encompasses the complex planning, control, and physical handling of the flow of production waste and end-of-life products from the point of origin to environmentally compliant disposal and recycling, including the necessary information flows, with the aim of accelerating flows and minimizing expenditures for the entire disposal process.
- The **transport logistics** encompasses the complex planning, control, and execution of material, parts, product, supply, and disposal transports, including the necessary

¹ The terms "production" and "manufacturing" are used synonymously.

information flows, incorporating all modes of transport, with the aim of minimizing the effort for the totality of transport processes and accelerating material flows.

- The **warehouse logistics** encompasses the complex planning, control, and handling of goods in a warehouse, including the necessary information flows, with the aim of optimally designing the totality and interaction of storage, order picking, and transport systems.
- The **materials management** encompasses the complex planning and control of requirements determination and inventory management, including the necessary information flows, with the aim of providing the materials required for value creation in the right quality and quantity at the right time and place at the lowest cost.

1.5 Logistics and Maintenance

Logistics can be described as a cross-functional strategy for optimizing product creation (Figure 1.4). In order to achieve the objectives of logistics – namely to make the right products and information available in the right quantities, in the right condition, at the right time, in the most economical way possible, at the right place – the deployment of materials, information, personnel, equipment, and energy must be planned, controlled, and monitored.

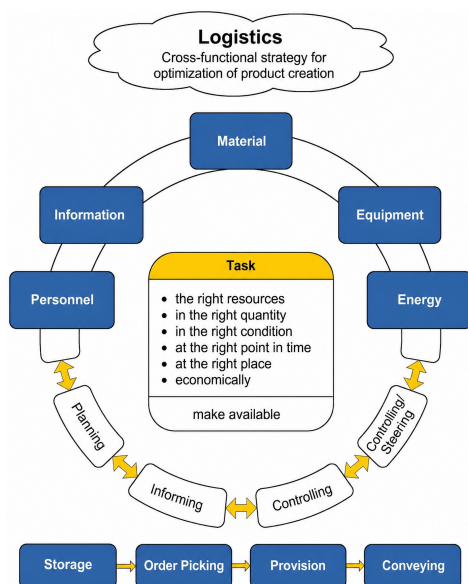


Figure 1.4 Logistics as a cross-functional strategy [40]

The storage systems, order picking systems, supply systems, information systems, planning and control systems depicted in Figure 1.4 are logistics elements that can be viewed and optimized individually. However, the optimization of individual logistics elements is not sufficient for a holistic perspective, since the relationships between the elements must also be taken into account.

This means that all business areas are affected by the cross-functional logistics strategy. Sub-areas of logistics, such as procurement logistics, distribution logistics, disposal logistics, transport logistics, information logistics, plant logistics and maintenance logistics make it possible to achieve the aforementioned objectives.

The **availability** is therefore the central concern of logistics, from which the **connection with maintenance** arises.

The following logistics tasks are of great importance in maintenance:

- Ensuring the availability of assets and equipment
- Ensuring the availability of personnel to carry out maintenance tasks
- Ensuring the availability of information (fault notifications, spare parts orders, remote diagnostics)
- Ensuring the availability of materials (spare parts procurement, spare parts provision, spare parts transport to the machine)
- Ensuring the maintenance-friendly arrangement of machines and equipment (facility planning taking into account maintenance requirements)

An integrated consideration of tasks from logistics and maintenance is only possible, however, if uniform data concepts exist in both areas that are linked to one another via defined interfaces.

These relationships arise in the information and material flow

- To suppliers,
- To procurement,
- To production,
- To sales,
- To disposal,
- To logistics service providers (e.g., freight forwarders),
- To customers.

In addition, further interfaces exist to the financial and accounting departments as well as to the human resources department of a company.

Logistics is a typical cross-sectional function (Figure 1.5) in the company, similar to human resources and finance. The problem with all cross-sectional functions is that a large number of interfaces exist where, if optimization is neglected, friction arises. Interfaces arise in the information and goods flow of logistics to suppliers, procurement, production in industrial companies, sales, disposal, logistics service providers

(e.g., freight forwarders), and customers. In addition, further interfaces exist with the finance and accounting department as well as the human resources department of a company.

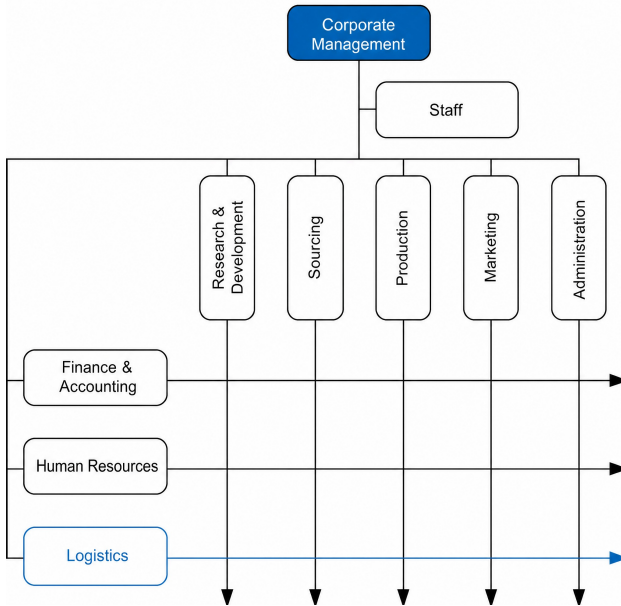


Figure 1.5 Logistics as a cross-sectional function [27]

As a result of the cross-sectional nature of logistics, logistical perspectives are less focused on individual **functions**, but more on the **overall process**. The holistic, process-oriented perspective began to establish itself in the mid-1980s, originating from the topic of quality considerations, and has become standard in many companies in recent years in the course of implementing the quality management standard ISO 9001:2015. Under the integrating perspective, in the case of logistics, the

consistent design of all information and material flows across the entire logistics chain, i.e., from the first supplier to the last customer

is to be understood.

1.6 Logistics Costs

1.6.1 Total Cost Thinking in Logistics

The interdependencies existing between the elements of a logistics system also affect the costs caused by these elements. Reducing costs in one logistics subsystem can lead

to an increase in costs in other subsystems and – if the cost reduction is smaller than the cost increases – to an overall increase in costs for the entire logistics system.

Thus, a reduction in transportation costs without considering a potentially associated increase in packaging or warehousing costs could result in an increase in delivery costs. Total cost thinking therefore requires the recording of all logistics costs relevant to a logistics decision. Figure 1.6 provides an overview of total logistics costs.

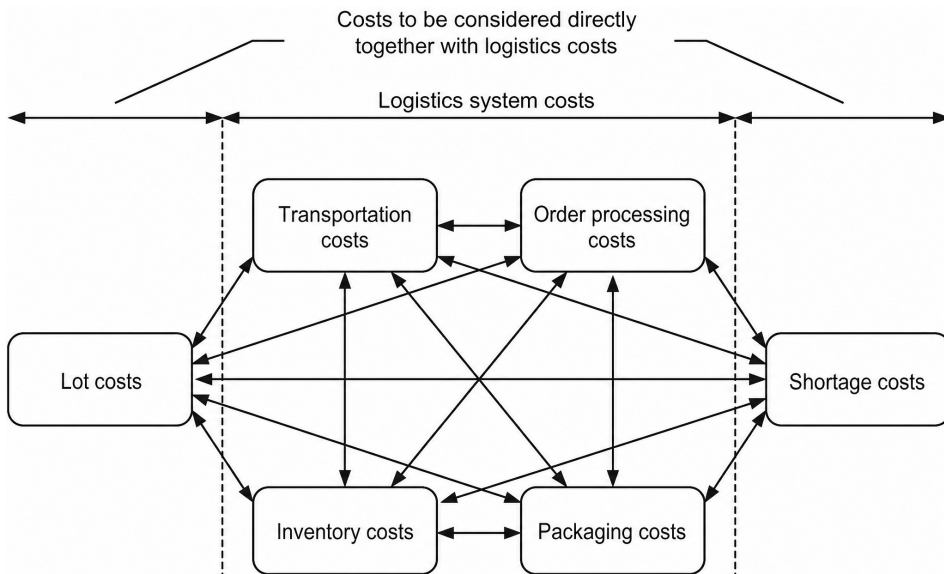


Figure 1.6 Total costs [49]

They are composed of **order processing costs**, **transportation costs**, **shipping costs**, **warehousing costs**, **packaging costs**, as well as **shortage costs** and **lot costs**.

Under **shortage costs** are understood costs that arise from an insufficient service level. These can include lost contribution margins for unsold products and lost customers, but also costs for production interruptions or unplanned changeovers.

Under **lot costs** are understood either setup costs (for production lots) or quantity-independent ordering costs (for order lots).

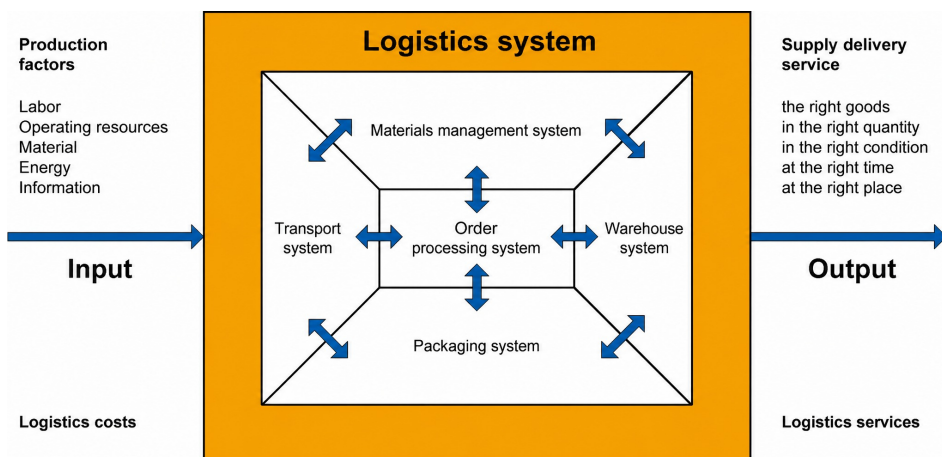
1.6.2 Conflict of Objectives

Total cost thinking is of great importance in logistics costs, as there are a large number of cost conflicts in this area, knowledge of which is a prerequisite for logistical thinking. Examples of this are given in Table 1.2.

Table 1.2 Cost Conflicts in Logistics [67]

Cost reductions in the area of	Cause	Cost increases in the area of
Transportation	↔	Stock levels
Packaging	↔	Transport damage
Order processing	↔	Transport
Warehousing	↔	Production

Logistics costs can be represented by the evaluated use of production factors in the logistics system. From a business perspective, costs as system input are only justified when corresponding services as system output are provided in return. As shown in Figure 1.7, logistical thinking is not only cost-oriented but also performance-oriented. This means that high logistics costs must be matched by a corresponding logistics performance.

**Figure 1.7** Functional delimitation of logistics systems [67]

1.7 Supply Chain Management

Supply Chain Management (SCM) has evolved from the ever-decreasing depth of manufacturing and the increasing flow orientation of companies. It addresses not just a single company but the entire value chain of a product as a whole. SCM requires cooperation among individual companies with the goal of efficiently supplying the market and customers through the coordination and integration of suppliers, producers, and retailers. In this context, cross-company processes are primarily considered and the frequently occurring problems at company interfaces are optimized [27] [28] [53].

This development requires an adaptation of information structures and information processing in the sense of decentralization. Logistics chains or supply chains represent value-added networks with various partners. From the perspective of the company that produces goods for the market, these partners can be suppliers, logistics service providers, or end customers (Figure 1.8).

The supply chain management approach serves to improve customer orientation, synchronize demand with supply, reduce inventories along the value chain, increase flexibility and demand-driven production, and shorten delivery times.

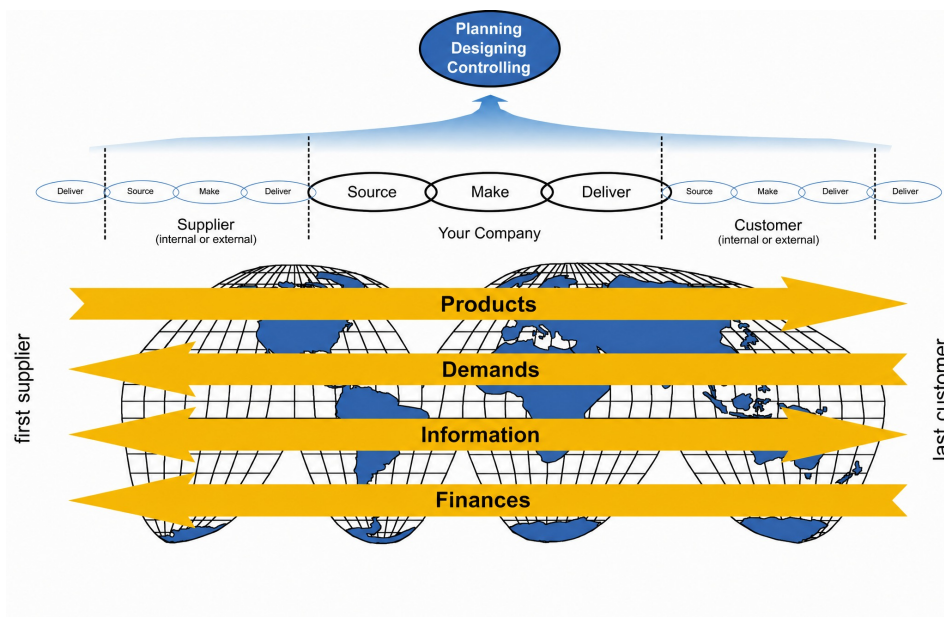


Figure 1.8 Supply chain management [82]

The supply chain describes all activities required to produce and deliver a product, from the first supplier to the final customer. Within the framework of supply chain management, many interdependent, so-called networked decisions must be made, which can also be competing.

1.7.1 Traditional Supply Chain

The classic treatment of the traditional supply chain according to the four fundamental components (plan, source, make, deliver) aims at optimizing the flow of materials and information through

- Low inventory levels,

- Optimized processes and low costs,
- High customer service,
- Cross-departmental and cross-company collaboration and communication,
- Reduced number of suppliers.

Despite these goals, a high degree of fragmentation in the supply chain continues to occur. Each company attempts, despite uncertainty due to asymmetric information distribution, to gain advantages over suppliers and customers through rational decisions. As little information as possible is disclosed, which results in high safety stocks and long response and delivery times (time-to-market, time-to-consumer) due to this "silo thinking" (Figure 1.9).

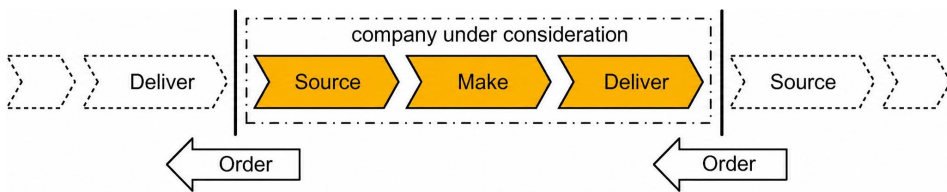


Figure 1.9 Traditional supply chain

1.7.2 Integrated Supply Chain

Supply chain management is currently the most widely discussed form of production management in industry and research, and calls for a consistently process-oriented and integrated view of the value chain from the customer back to the first supplier in the chain. In Figure 1.10, the broadening of perspective beyond company boundaries is illustrated.

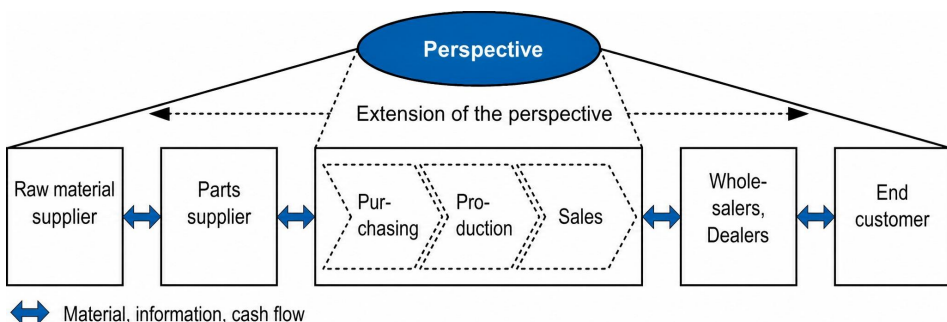


Figure 1.10 Broadening of perspective

At the center of supply chain management is the targeted and customer-oriented design and operation of the value chain and logistics chain. An overall optimum is sought in which all participants of the supply chain share. Planning, sourcing, manufacturing, and delivery are the four fundamental components of the supply chain, extending across all areas of the manufacturing and delivery process. An overall optimum is sought in which all participants of the supply chain are to participate. The supply chain encompasses:

- Control and alignment of product supply with demand
- Procurement of raw materials and components
- Manufacturing and assembly
- Storage and inventory control
- Order entry and order processing
- Shipping and delivery to the customer

In the past, manufacturing companies were the driving force in supply chain management. They determined the speed at which products were produced and distributed. Nowadays, it is the customers, so that manufacturers strive to meet customer requirements with regard to variants and functionality, fast order processing, and short delivery times.

In order to meet the requirement of permanently changing and improving products and processes, a cross-functional process design is needed. Companies whose organization is divided into separate functional areas (e.g., purchasing, engineering, assembly, logistics) struggle in most cases with **interface problems**, such as communication difficulties and departmental thinking, unclear order responsibility, information losses as well as redundancies, scrap, and rework.

The following objectives are to be achieved through a cross-company, process-oriented view of logistics (Figure 1.11):

- Optimization of the entire supply chain from the raw material supplier to the end customer
- Synchronization of all process steps to smooth interfaces
- Use of comprehensive IT systems to increase speed and avoid errors
- Permanent supply security according to customer demand
- Consistent customer orientation

Core components of an integrated supply chain are [52]:

- Partnership-based, cross-company cooperation
- Re-design of core processes
- IT system

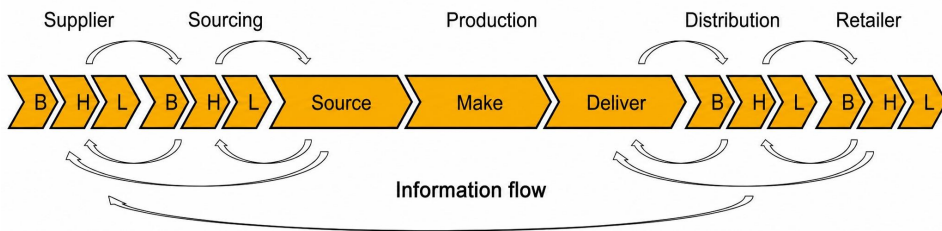


Figure 1.11 Integrated supply chain

1.7.2.1 Partnership-Based, Cross-Company Cooperation

For this purpose, it is necessary to develop a common long-term objective system (where one wants to position oneself; mass or niche?), to build mutual trust, and to make information such as forecast data, inventory levels, or sales data available. In doing so, mistrust and the risk of misuse may arise (one becomes "transparent").

In any case, it makes sense to establish rules (contract or letter of intent) as to who is responsible for what, how decisions are made, and how benefits from cost reductions are shared.

1.7.2.2 Re-Design of Core Processes

In order to achieve the synergies already described, redundant or non-value-adding processes should be eliminated (e.g., quality control at the supplier's outbound and the customer's inbound) and business processes should be designed in a customer-oriented manner.

In a functioning supply chain, it is possible to focus on core processes and to outsource processes that another company could handle more efficiently. The goal is to achieve a competitive advantage through innovative, change-flexible, yet robust business processes.

1.7.2.3 IT System

The IT system should map the business processes and act as an "enabler". The coordination of value-adding processes and communication between companies should be facilitated by a uniform exchange of information at the interfaces (Electronic Data Interchange – EDI).

For example, order quantities are automatically sent by the retailer to all upstream stages. These can react earlier, which is intended to reduce safety stock levels. This achieves the goal of accelerated material flow and reduced inventory costs.

1.7.3 Supply Chain Vs. Supply Network

In the case of multiple suppliers or customers, convergent and divergent connections arise; this is also referred to as a "value network", cf. e.g. the automotive sector with its multi-tier, complex "supply network" (Figure 1.12).

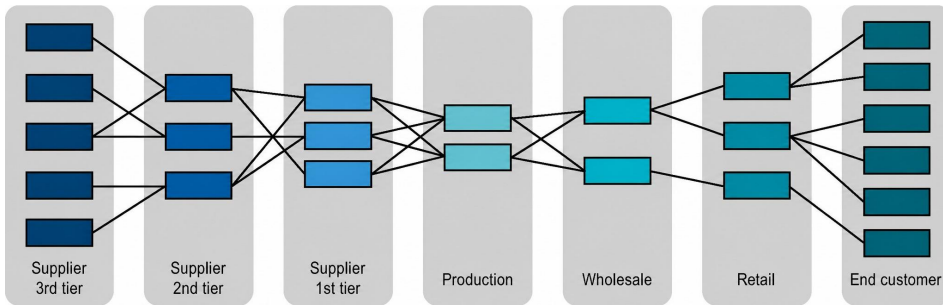


Figure 1.12 Multi-tier "supply network"

In the future, it will not be individual companies competing with each other, but entire logistics chains or logistics networks. Until now, the efficiency efforts of the companies involved in the supply chain have been limited to extracting the highest possible performance requirements from each other. The outcome of these negotiations depended essentially on the purchasing power of the retailer and the brand attractiveness of the supplier.

Process development and optimization in the logistics chain is just as important as process development and optimization in production itself.

1.7.4 Logistics Process Development Based on Reference Models Using the Example of the SCOR Model

A reference model, in the context presented here, is a model created for an industry or an entire economic sector that is intended to have a universally valid character. It serves as a basis for the development of company-specific models [47].

The Supply Chain Operations Reference (SCOR) model is maintained by the Association for Supply Chain Management (ASCM) (formerly Supply Chain Council/APICS). It is a reference model for companies in all industries and serves as a "common language" for the structured design, analysis, and benchmarking of supply chain processes. The model supports the planning, control, and improvement of logistics operations and helps to identify performance gaps using standardized key performance indicators [86].

The current version of the classic SCOR framework is version 12.0 from 2017 [166]. According to ASCM, the updated version includes further new factors for supply chain success, including omnichannel, metadata, and blockchain. The framework has been modernized so that best practices are better aligned with **digital strategies**, including new training information and **integrated sustainability standards** using the Global Reporting Initiative (GRI). The Digital Capabilities Model (DCM) and the digital standard SCOR (SCOR DS) were also published in 2019 to address the growing need for digitalization in the SCOR model.

Reference models – with a specific logistics focus, the SCOR model – provide a practical and meaningful basis for the development, conception, planning, and evaluation of logistics tasks as well as the improvement of logistics processes.

The objective of the SCOR model is to standardize business processes within supply chains and thus make them comparable and assessable. Looking at the SCOR model with a focus on logistics, it offers a framework for the conception and detailed planning of logistics processes – both for intra-company and cross-company logistics tasks. By applying the model, existing processes can be examined for their weaknesses and improvement potentials can be identified. Furthermore, the model supports the analysis and optimization of the relationships between processes as well as the interfaces with customers and suppliers.

1.7.4.1 Structure of the SCOR Model

Logistics chains and value chains within and between companies are represented in the SCOR model by linking the five fundamental main processes Plan, Source, Make, Deliver, and Return (Figure 1.13)

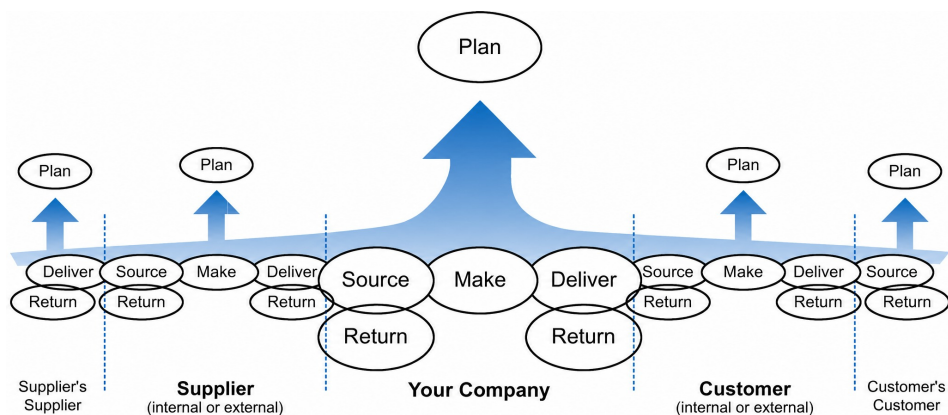


Figure 1.13 The five main processes of the SCOR model [86]

Using these five defined main processes, all logistic processes – simple as well as highly complex – can be mapped using the model. It is essential that companies from various industries can describe their logistics processes in this way.

This makes it possible to connect different companies regardless of their industry and subsequently to represent both the breadth and the depth of any supply chain.

The following business cases can be described using the SCOR model:

- All interactions with customers from order receipt to payment receipt
- All transactions of physical products and services from the supplier's supplier to the customer's customer, including machinery, materials, spare parts, software, etc.
- All interactions with the market, from capturing demand to fulfilling all orders

Areas such as marketing and sales, research, technology development, and customer services are not covered.

1.7.4.2 Process Types in the SCOR Model

The SCOR model distinguishes between three different process types:

Planning processes (*Planning*)

The planning processes encompass all elements and activities that balance expected resources with expected demand. They compensate for fluctuations in demand within a specific planning horizon. Planning processes are usually carried out at regular intervals and contribute significantly to the management of logistics chains.

Execution processes (*Execution*)

Execution processes are triggered by planned or actual demand. These include all activities related to changing the state of materials or goods. This encompasses production scheduling and detailed planning, the transformation of raw materials or input products into finished products or services, as well as the transport required for this. The main processes Source, Make, Deliver, and Return belong to this process type.

Enabling processes (*Enable*)

Enabling processes describe the preparation, updating, and management of information or relationships required for the planning and execution processes.

The SCOR model should not be understood as a rigid framework, but rather as a modular system from which companies can select the "process building blocks" necessary to represent their own processes. In this way, the workflows of any company can be represented (Figure 1.14).