

Chapter 1 An Introduction to Logistics



1.1 What Is Logistics?

Key points: logistics; demand; competitive advantage

Difficult points: logistics

Requirements:

By the end of this lesson, you should be able to

- understand the definition of logistics.
- understand the history of logistics.

In the early part of 1991 the world was given a dramatic example of the importance of logistics. **As a precursor to the Gulf War it had been necessary for the United States and its allies to move huge amounts of material great distances in what were thought to be impossibly short time-frames.** Half a million people and over half a million tones of material and supplies were airlifted 12,000 kilometers with a further 2.3 million tones of equipment moved by sea - all of this achieved in a matter of months.

Throughout the history of mankind wars have been won and lost through logistics strengths and capabilities-or the lack of them. It has been argued that the defeat of the British in the American War of Independence can largely be attributed to logistics failure. The British Army in America depended almost entirely upon Britain for supplies. At the height of the war there were 12,000 troops overseas and for the most part they had not only to be equipped, but fed from Britain. For the first six years of the war the administration of these vital supplies was totally inadequate, affecting the course of operations and the morale of the troops. An organization capable of supplying the army was not developed until 1781 and by then it was too late.

In the Second World War logistics also played a major role. The Allied Forces' invasion of Europe was a highly skilled exercise in logistics, as was the defeat of Rommel in the desert. Rommel himself once said that "... before the fighting proper, the battle is won or lost by quartermasters. "

However while the Generals and Field Marshals from the earliest times have understood the critical role of logistics, strangely it is only in the recent past that business organizations have come to recognize the vital impact that logistics management can have in the achievement of competitive advantage. This lack of recognition partly springs from the relative level of understanding of benefit of integrated logistics. Arch Shaw, writing in 1915, pointed out that:

The relations between the activities of demand creation and physical supply ... illustrate the existence of the two principles of interdependence and balance. Failure to co-ordinate any one of these activities with its group-fellows and also with those in the other group, or undue emphasis or outlay-put upon any one of these activities, is certain to upset the equilibrium of forces which means efficient distribution.

The physical distribution of the goods is a problem distinct from the creation of demand ... Not a few worthy failures in distribution campaigns have been due to such a lack of co-ordination between demand creation and physical supply...

Instead of being a subsequent problem, this question of supply must be met and answered before the work of distribution begins.

It has taken a further 70 years or so for the basic principles of logistics management to be clearly defined.

What is logistics management in the sense that it is understood today? There are many ways of defining logistics but the underlying concept might be defined as follows:

Logistics is the process of strategically managing the procurement, movement and storage of materials, parts and finished inventory (and the related information flows) through the organization and its marketing channels in such a way that current and future profitability are maximized through the cost-effective fulfillment of orders.

This basic definition will be extended and developed as the book progresses, but it makes an adequate starting point.

New Words And Terms

frame	n. [freim]	构架、骨架、结构；框架、结构
time-frames		(事情发生时的) 时间范围
logistics	n. [lə'dʒɪstɪks]	物流学、后勤学；(生产活动等) 有效安排、物流组织
strength	n. [streŋθ]	力量、实力
attribute	v. [æ'trɪbjʊ:t]	把……归因于；认为……属于
administration	n. [əd'mɪnɪ'streɪʃən]	管理、经营；行政、行政机关
vital	a. ['vaɪt]	生命的；有生命力的；致命的
inadequate	a. [ɪn'ædɪkwɪt]	不充分的、不适当、不能胜任
allied	a. [ə'leɪd]	结盟的
Allied Forces		(第一次世界大战的) 协约国军队；(第二次世界大战的) 同盟国军队
invasion	n. [ɪn'veɪʒən]	入侵；侵害
quartermaster	n. [kwɔ:tə'mɑ:stə]	军需军官
recognize	v. ['rekəgnaɪz]	认识；承认
impact	n. ['ɪmpækt]	冲击力；作用

integrated	a. ['ɪntɪɡreɪtɪd]	整体的；互相协调的
illustrate	v. ['ɪləstreɪt]	(用图或例子等) 说明
interdependence	n. [ˌɪntədɪ'pendəns]	互相依赖、互相依存
co-ordinate	n. [kəu'ɔdɪnɪt]	同等的事物
group-fellows		团队成员
equilibrium	n. [i:kwi'brɪəm]	平衡；均势
distribution	n. [dɪstrɪ'bju:ʃən]	分配；分销
physical distribution		实体分配
underlying	a. [ˌʌndə'laɪɪŋ]	在下面的
strategically	adv. [strə'tɪ:dʒɪkli]	在战略上地
procurement	n. [prə'kjue'mənt]	获得、实现
storage	n. ['stɔ:rdʒ]	储存、保管；库存量；仓库、货栈
inventory	n. ['ɪnvəntri]	财产目录；存货
information flows		信息流
marketing	n. ['mɑ:kɪtɪŋ]	市场营销
channel	n. ['tʃænl]	渠道
fulfillment	n. [fʌl'fɪl'mənt]	履行、实现；完成
order	n. ['ɔ:də]	定货、定货单

Sentence Explanations

1. As a precursor to the Gulf War it had been necessary for the United States and its allies to move huge amounts of material great distances in what were thought to be impossibly short time-frames. 作为海湾战争的准备，美国和其同盟者在被认为不可能的时间内，必须超远距离地运输大量军需品。

2. However while the Generals and Field Marshals from the earliest times have understood the critical role of logistics, strangely it is only in the recent past that business organizations have come to recognize the vital impact that logistics management can have in the achievement of competitive advantage. 尽管将军和陆军元帅很早就认识到了后勤的关键作用，令人奇怪的是企业在不久之前才刚刚认识到物流管理在构筑竞争优势方面的重要作用。

3. Failure to co-ordinate any one of these activities with its group-fellows and also with those in the other group, or undue emphasis or outlay-put upon any one of these activities, is certain to upset the equilibrium of forces which means efficient distribution. 如果与活动中任何一个部分以及其他部分不能相互协调，或者不恰当地重点强调整体活动中的任何一个部分，肯定会扰乱有效率分销的均势因素。

Questions

1. What is the logistics?
2. How do you comprehend the sentence “logistics encompasses much more than just the transportation and warehouse”?

Reading

What Is Logistics?

"Logistics means having the right thing, at the right place, at the right time."

Logistics - (*business definition*) Logistics is defined as a business planning framework for the management of material, service, information and capital flows. It includes the increasingly complex information, communication and control systems required in today's business environment. — (Logistics Partners Oy, Helsinki, FI, 1996)

Logistics - (*military definition*) The science of planning and carrying out the movement and maintenance of forces... those aspects of military operations that deal with the design and development, acquisition, storage, movement, distribution, maintenance, evacuation and disposition of material; movement, evacuation, and hospitalization of personnel; acquisition of construction, maintenance, operation and disposition of facilities; and acquisition of furnishing of services. — (JCS Pub 1-02 excerpt)

Logistics - The procurement, maintenance, distribution, and replacement of personnel and materiel. — (Websters Dictionary)

Logistics - 1. The branch of military operations that deals with the procurement, distribution, maintenance, and replacement of materiel and personnel. 2. The management of the details of an operation. — (American Heritage Dictionary)

Logistics - "...the process of planning, implementing, and controlling the efficient, effective flow and storage of goods, services, and related information from point of origin to point of consumption for the purpose of conforming to customer requirements." Note that this definition includes inbound, outbound, internal, and external movements, and return of materials for environmental purposes. — (Reference: Council of Logistics Management, <http://www.clm1.org/mission.html>, 12 Feb 98)

Logistics - The process of planning, implementing, and controlling the efficient, cost effective flow and storage of raw materials, in-process inventory, finished goods and related information from point of origin to point of consumption for the purpose of meeting customers' requirements. — (Reference: Canadian Association of Logistics Management, <http://www.calm.org/calm/AboutCALM/AboutCALM.html>, 12 Feb, 1998)

Logistics - The science of planning, organizing and managing activities that provide goods or services. — (MDC, LogLink / LogisticsWorld, 1997)

Logistics - Logistics is the science of planning and implementing the acquisition and use of the resources necessary to sustain the operation of a system. — (Reference: ECRC University of

Scranton / Defense Logistics Agency Included with permission from: HUM - The Government Computer Magazine “Integrated Logistics” December 1993, Walter Cooke, Included with permission from: HUM - The Government Computer Magazine.)

Logistics - To perform logistics functions or processes. The act of planning, organizing and managing activities that provide goods or services. — (MDC, LogLink / LogisticsWorld, 1997)

Logistics Functions - (*classical*) planning, procurement, transportation, supply, and maintenance. — (United States Department of Defense DOD)

Logistics Processes - (*classical*) requirements determination, acquisition, distribution, and conservation. — (United States Department of Defense DOD)

Business Logistics - The science of planning, design, and support of business operations of procurement, purchasing, inventory, warehousing, distribution, transportation, customer support, financial and human resources. — (MDC, LogLink / LogisticsWorld, 1997)

Acquisition Logistics - Acquisition Logistics is everything involved in acquiring logistics support equipment and personnel for a new weapons system. The formal definition is “the process of systematically identifying, defining, designing, developing, producing, acquiring, delivering, installing, and upgrading logistics support capability requirements through the acquisition process for Air Force systems, subsystems, and equipment.” — (Reference: Air Force Institute of Technology, Graduate School of Acquisition and Logistics.)

Integrated Logistics Support (ILS) (1) - ILS is a management function that provides planning, funding, and functioning controls which help to assure that the system meets performance requirements, is developed at a reasonable price, and can be supported throughout its life cycle. — (Reference: Air Force Institute of Technology, Graduate School of Acquisition and Logistics.)

Integrated Logistics Support (ILS) (2) - Encompasses the unified management of the technical logistics elements that plan and develop the support requirements for a system. This can include hardware, software, and the provisioning of training and maintenance resources. — (Reference: ECRC University of Scranton / Defense Logistics Agency Included with permission from: HUM - The Government Computer Magazine “Integrated Logistics” December 1993, Walter Cooke.)

Logistics Support Analysis (LSA) - Simply put, LSA is the iterative process of identifying support requirements for a new system, especially in the early stages of system design. The main goals of LSA are to ensure that the system will perform as intended and to influence the design for supportability and affordability. — (Reference: Air Force Institute of Technology, Graduate School of Acquisition and Logistics.)

→ Notes

Competitive Advantage 竞争优势

由美国人波特 (Michael E. Porter) 在 1985 年出版的《Competitive Advantage》一书中提出。竞争优势是指企业的产品和服务与竞争者有所区别并享有优势，并能提供给客户更多的价值。



1.2 The Logistics of Business Is Big and Important

Key points: supply chain; competitive advantage

Difficult points: competitive advantage

Requirements:

By the end of this lesson, you should be able to

- understand the importance of the logistics.
- describe the relationship between logistics and firms.

It is through the logistical process that materials flow into the manufacturing capacity of an industrial nation and products are distributed to consumers. The recent growth global commerce and the introduction of e-commerce have expanded the size of complexity of logistical operations.

Logistics adds value to the supply chain process when inventory is strategically positioned to achieve sales. Creating logistics value is costly. Although difficult to measure, most experts agree that the annual expenditure to perform logistics in the United States was approximately 10.1 percent of the \$9.96 billion Gross National Product (GNP) or \$1.006 billion. As further illustrated by Dell, the logistics of business is truly big business!

DELL GOES TO THE EXTREME

According to industry legend, Henry Ford's manufacturing philosophy was "You can have any color you want as long as it's black." The manufacturing strategy that has fostered unprecedented success for Dell Computers is the exact opposite of Ford's mindset: "Build every order to order." Essentially, it spawns the ultimate manufacturing oxymoron: mass customization.

The critical component to facilitate mass customization is a logistics program built upon a concept of "extreme warehousing" and a superior software platform. Ryder Integrated Logistics, a subsidiary of Ryder Systems, Miami, Florida, houses supplier-owned inventory for Dell at locations in Austin, Texas, and Nashville, Tennessee. The Austin facility is fed by 50 global suppliers and the Nashville site is fed by 60 vendors worldwide.

"Dell requires suppliers to respond with order fulfillment within two hours. The only way suppliers can meet this expectation is to utilize our logistics management," explains Dave Hanley, director of business development for Ryder. "Dell maintains less than six days of inventory, and turns work-in-process approximately 264 times annually. The company uses our services to minimize investment in inventory, and to abolish 'dead space' or 'nonproductive storage areas'."

"We replenish to kanbans and maintain a working inventory at the production facility," Hanley says. "Dell does an incredible job of estimating what products will be selling, and different products peak at various times. Laptops are big now and business machines are more popular in the first quarter of the

year than in the last.”

Currently, Ryder has responsibility for the inventory from the time it arrives at its facilities until it delivers to Dell. Hanley is confident that incorporating Ryder's processes and logistics management across all inbound shipments from suppliers, beginning at every point of origin, would bring tremendous additional value to Dell.

While he acknowledges Dell is the master of execution in manufacturing, Hanley says the software used by Ryder to manage the extreme warehousing requirements is one of the computer manufacturer's “top three critical success factors.”

The software had to satisfy many requirements—from open architecture to a scalable platform that would grow with Dell. The solution has done precisely that, expanding with the Austin facility as it grew from 12,000 square feet in 1997 to more than 600,000 square feet by 1999.

“Extreme warehousing demands fast response and critical management,” says Hanley. “There's a live customer waiting for the order, and a mistake today means a disappointed customer in just two days.”

This rapid fulfillment doesn't allow recovery time for mistakes, so the WMS has to execute perfectly and flawlessly on every order, he notes.

(Source: Anonymous, “Dell Goes to the Extreme”, Inbound Logistics, January 2000, p. 122.)

Despite the sheer size of logistical expenditure, the excitement of lean logistics is not cost containment or reduction. The excitement generates from understanding how select firms use logistical competency to achieve competitive advantage. Firms that have developed world-class logistical competency enjoy competitive advantage as a result of providing important customers superior service. Leading logistical performers typically implement information technology capable of monitoring global logistical activity on a real time basis. Such technology identifies potential operational breakdowns and facilitates corrective action prior to delivery service failure. **In situations where timely corrective action is not possible, customers can be provided advance notification of developing problems, thereby eliminating the surprise of an unavoidable service failure. In many situations, working in collaboration with customers and suppliers, corrective action can be taken to prevent operational shutdowns or costly customer service failures. By performing at above industry average with respect to inventory availability, speed and consistency of delivery, and operational efficiencies, logistically sophisticated firms are ideal supply chain partners.**

New Words And Terms

consistency	<i>n.</i> [kən'sistənsi]	一致、一贯；浓度、坚度、硬度
capacity	<i>n.</i> [kə'pæsəti]	容纳力、学习力、理解力；能量、容量、效能
position	<i>v.</i> [pə'ziʃn]	安置在适当的位置、决定……之位置
contain	<i>v.</i> [kən'tein]	控制

reduction	<i>n.</i> [ri'dʌkʃən]	减少、减小、缩减
Gross Nation Product(GNP)		国民生产总值
sheer	<i>a.</i> [ʃiə]	纯粹的、全然的
identify	<i>v.</i> [ai'dentifai]	认出、识别、鉴定
notification	<i>n.</i> [nəʊtifi'keɪʃn]	通知（书）、布告
availability	<i>n.</i> [əveɪlə'bɪləti]	有效（性）、可得性
sophisticated	<i>a.</i> [sə'fɪstɪkeɪtɪd]	老于世故的、高级的
implement	<i>v.</i> ['ɪmplɪmənt]	贯彻
real time		实时
breakdown	<i>n.</i> ['breɪkdaʊn]	崩溃、倒塌、失败
collaboration	<i>n.</i> [kə'læbə'reɪʃn]	合作

Sentence Explanations

1. It is through the logistical process that materials flow into the manufacturing capacity of an industrial nation and products are distributed to consumers. 通过物流过程，原材料进入一个工业国家形成制造能力，并且将产品分销给消费者。

2. The recent growth global commerce and the introduction of e-commerce have expanded the size of complexity of logistical operations. 近来全球商业的增长和电子商务的引入已经扩大了物流运营的复杂程度。

3. In situations where timely corrective action is not possible, customers can be provided advance notification of developing problems, thereby eliminating the surprise of an unavoidable service failure. 在不能及时采取正确行动的情形下，顾客可以预先得到出现问题的通知，由此不会使顾客对于一个不可避免的服务失败感到惊讶。

4. In many situations, working in collaboration with customers and suppliers, corrective action can be taken to prevent operational shutdowns or costly customer service failures. 在很多情况下，与顾客和供应商一起合作，公司可以采取正确的行动来防止运营的停滞或高代价的顾客服务的失败。

5. By performing at above industry average with respect to inventory availability, speed and consistency of delivery, and operational efficiencies, logistically sophisticated firms are ideal supply chain partners. 当存货有效，交货的速度和一致性以及操作效率都超过行业平均水平时，那么这家企业的物流工作水平就高，它就是理想的供应链合作伙伴。

Questions

1. Discuss the functions of the logistics.
2. Give some examples to illustrate the importance of a firm's logistical activities.
3. Could you explain how a firm can achieve competitive advantage by using logistical competency?

Reading

Logistics and Supply Chain as Competitive Business Weapons

If you do not already consider and treat Logistics and Supply Chain Management as a weapon in your company's competitive business arsenal, now is the time to take a sober second look at this rapidly advancing area. Existing competition, or new wave online competitors may already be taking aim at your firm and your customers as you read this article.

It is indeed absolutely astounding how fast change is now occurring in Logistics and Supply Chain Management. This week represents the first in a series of features here on About.com focusing on the three major reasons Logistics and Supply Chain Management is rapidly becoming one of the most central of business issues as we enter the new millennium.

In this feature, we explore the major impact the more slowly growing Internet Home Shopping and Consumer Direct business models will have over time on traditional distribution methods and channels, and end with descriptions of two related future features outlining the other important reasons why keeping up to date on Logistics and Supply Chain Management is critical to the future health and success of your company.

Traditional players ignore this threat at their peril and must rapidly begin to adjust their networks to support and defend against these challenges from surviving online pioneers like Amazon.com, Net Grocer and Peapod.com to name a few. Any traditional firms who do not rise to this challenge will sooner or later face significant negative business fallout and increasing percent to sales expense ratios as this growth occurs.

Much of the change we speak of is driven by the concept of Disintermediation which basically represents the removal of all "middlemen" which add no real value between the process of manufacturing a product and its' movement and ultimate sale to the end consumer. In the purest form, application of this concept challenges the need for a manufacturer to use distributors and even retailers as channels to move their products to end consumers. In most cases, traditional distributors and retailers only add cost and their profit margins to the total "to end consumer" cost.

Companies who are current intermediaries that ignore this reality and do not ensure that their involvement adds true value will be cut out of the consumer delivery channel by savvy Manufacturers and/or ultimately the direct price market forces caused by consumers demanding the lowest total end consumer price.

Wal-Mart is one firm which has already identified this key challenge and are moving rapidly to provide true value add for the manufacturers who work with them to give consumers better ultimate value. In interviews before stepping aside, ex-Wal-Mart CEO David Glass said that although their online business only represented a very small part of their current total revenues, they consider it to be a key part of Wal-Mart's future strategy. If you visit their website through the link above you will notice that it is now a prime time business site which less than a few years or so ago wasn't much more than an outlet for clearance merchandise.

As well, it is important to note that Wal-Mart offers variable service and delivery cost models

like the US Postal Service or UPS Express Delivery as examples, giving the consumer control of the end cost to themselves based on the actual level of service and speed they desire. Given the coming dramatic shift to Direct to Home Delivery and associated smaller order sizes, courier companies are incredibly well positioned with current high levels of delivery density in all markets. This means that companies like Wal-Mart with huge volumes of business and low rates with these courier companies will be very well positioned. As well, tight business interfaces between these firms add even more efficiency to the mix and a company like Wal-Mart which actually has named Courier Departments in all of their Distribution Centers across the country are even further advantaged.

Not only satisfied with positioning such as described above, companies like Wal-Mart have also worked diligently for several years to integrate themselves with their manufacturer partners to together remove costs and time from the Logistics and Supply Chain parts of the business and are pioneers and leaders in initiatives such as CPFR.

Where do all of these developments point and what are the dynamics that may arise from the concepts described above? The author suggests that we will see the rise of Competing Supply Chains. In a nutshell, what may ultimately emerge are tightly knit competing supply chains which battle for the lowest costs and methods of serving the consumer on a worldwide basis. Specific Consumer Products Manufacturers and Retail/Order Delivery Entities will ultimately align themselves to develop the most collaborative, lowest cost and truly competitive supply chain.

Notes

Supply Chain 供应链

货物从生产者到消费者的整个流通过程。供应链又称销售链（sales chain），如果强调的是客户则可称为需求链（demand chain）。



1.3 The Work of Logistics

Key points: supply chain; order processing; inventory; transportation; warehousing; materials handling; packaging; facility network

Difficult points: logistical value

Requirements:

By the end of this lesson, you should be able to

- understand the interrelated nature of the five areas of logistical work.
- understand integrated logistical management.
- describe the personality of every functional work of the logistics.

In the context of supply chain management, logistics exists to move and position inventory to achieve desired time, place, and possession benefits at the lowest total cost. Inventory has limited value until it is positioned at the right time and at the right location to support ownership transfer or value-added creation. If a firm does not consistently satisfy time and place requirements, it has nothing to sell. For a supply chain to realize the maximum strategic benefit of logistics, the full range of functional work must be integrated. Decisions in one functional area will impact cost of all others. It is this interrelation of functions that challenges the successful implementation of integrated logistical management. Figure 1.3.1 provides a visual representation of the interrelated nature of the five areas of logistical work: (1) order processing; (2) inventory; (3) transportation; (4) warehousing, materials handling, and packaging; and (5) facility network. As described below, work related to these functional areas combines to create the capabilities needed to achieve logistical value.

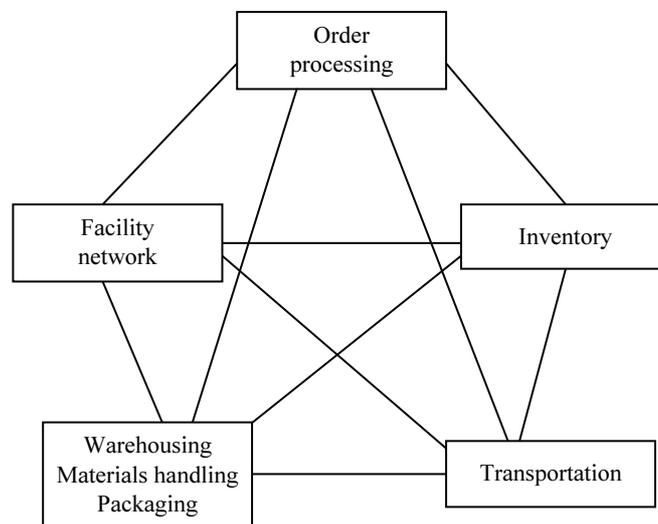


Figure 1.3.1 Integrated Logistics

Order Processing

The importance of accurate information to logistical performance has historically been under appreciated. While many aspects of information are critical to logistics operations, the processing of orders is of primary importance. Failure to fully understand this importance resulted from a failure to understand how distortion and dynamics impact logistical operations.

Inventory

The inventory requirements of a firm are directly linked to the facility network and the desired level of customer service. Theoretically, a firm could stock every item sold in every facility dedicated to servicing each customer. Few business operations can afford such a luxurious inventory commitment because the risk and total cost are prohibitive. The objective in inventory strategy is to achieve desired customer service with the minimum inventory commitment. Excessive inventories may compensate for deficiencies in basic design of a logistics system but will ultimately result in higher-than-necessary total logistics cost.

Logistical strategies should be designed to maintain the lowest possible financial investment in

inventory. The basic goal is to achieve maximum inventory turn while satisfying service commitments. A sound inventory strategy is based on a combination of five aspects of selective deployment: (1) core customer segmentation, (2) product profitability, (3) transportation integration, (4) time-based performance, and (5) competitive performance.

Every enterprise that sells to a variety of different customers confronts uneven opportunity. Some customers are highly profitable and have outstanding growth potential; others do not. The profitability of a customer's business depends upon the products purchased, volume, price, value-added services required, and supplemental activities necessary to develop and maintain an ongoing relationship. Because highly profitable customers constitute the core market of every enterprise, inventory strategies need to focus on them. The key to effective logistical segmentation rests in the inventory priorities dedicated to support core customers.

Transportation

Transportation is the operational area of logistics that geographically moves and positions inventory. Because of its fundamental importance and visible cost, transportation has traditionally received considerable managerial attention. Almost all enterprises, big and small, have managers responsible for transportation.

Transportation requirements can be satisfied in three basic ways. First, a private fleet of equipment may be operated. Second, contracts may be arranged with dedicated transport specialists. Third, an enterprise may engage the services of a wide variety of carriers that provide different transportation services on a per shipment basis. From the logistical system viewpoint, three factors are fundamental to transportation performance: (1) cost, (2) speed, and (3) consistency.

Warehousing, Materials Handling, and Packaging

The first three functional areas of logistics – order processing, inventory, and transportation can be engineered into a variety of different operational arrangements. Each arrangement has the potential to contribute to a specified level of customer service with an associated total cost. In essence, these functions combine to create a system solution for integrated logistics. The fourth functionality of logistics – warehousing, materials handling, and packaging – also represents an integral part of a logistics operating solution. However, these functions do not have the independent status of those previously discussed. Warehousing, materials handling, and packaging are an integral part of other logistics areas. For example, inventory typically needs to be warehoused at selected times during the logistics process. Transportation vehicles require materials handling for efficient loading and unloading. Finally, the individual products are most efficiently handled when packaged together into shipping cartons or other unit loads.

When distribution facilities are required in a logistical system, a firm can choose between the services of a warehouse specialist or operating their own facility. **The decision is broader than simply selecting a facility to store inventory since many value-adding activities may be performed during the time products are warehoused. Examples of such activities are sorting, sequencing, order selection, transportation consolidation, and, in some cases, product modification and assembly.**

Facility Network

Classical economics neglected the importance of facility location and overall network design to

efficient business operations. **When economists originally discussed supply-and-demand relationships, facility location and transportation cost differentials were assumed either nonexistent or equal among competitors.** In business operations, however, the number, size, and geographical relationship of facilities used to perform logistical operations directly impacts customer service capabilities and cost. Network design is a primary responsibility of logistical management since a firm's facility structure is used to ship products and materials to customers. Typical logistics facilities are manufacturing plants, warehouses, cross-dock operations, and retail stores.

Network design is concerned with determining the number and location of all types of facilities required to perform logistics work. It is also necessary to determine what inventory and how much to stock at each facility as well as the assignment of customers. The facility network creates a structure from which logistical operations are performed. Thus, the network integrates typically combined into larger units. This larger unit, typically called the master carton, provides two important features. First, it serves to protect the product during the logistical process. Second, the master carton facilitates ease of handling, by creating one large package rather than a multitude of small, individual products. For efficient handling and transport, master cartons are typically consolidated into larger unit loads. The most common units for master carton consolidation are pallets, slip sheets and various types of containers.

When effectively integrated into an enterprise's logistical operations, warehousing, materials handling, and packaging facilitate the speed and overall ease of product flow throughout the logistical system. In fact, several firms have engineered devices to move broad product assortments from manufacturing plants directly to retail stores without intermediate handling.

New Words And Terms

interrelation	<i>n.</i> [ˌɪntəriˈleɪʃn]	相互关系
distortion	<i>n.</i> [dɪˈstɔːʃn]	变形、扭曲、歪曲
dynamics	<i>n.</i> [daɪˈnæmiks]	力学、动力学、受内心道德力量的驱使
theoretically	<i>adv.</i> [θiəˈretɪkli]	基于理论上地、从理论上讲
dedicate	<i>v.</i> [ˈdedɪkeɪt]	奉献、献身
commitment	<i>n.</i> [kəˈmɪt,mənt]	委托、所承诺之事、许诺、保证、承约
prohibitive	<i>a.</i> [prəˈhɪbɪtɪv]	禁止的
deploy	<i>v.</i> [dɪˈplɔɪ]	(使)展开、使开展活动或工作
uneven	<i>a.</i> [ʌnˈiːvn]	不平的、不平衡的
priority	<i>n.</i> [praɪˈɒrɪti]	先, 前; 优先, 重点
carton	<i>n.</i> [ˈkɑːtən]	纸板盒
consolidation	<i>n.</i> [kənˌsɒlɪˈdeɪʃn]	合并; (集装箱运输中零担货物的) 拼箱
pallet	<i>n.</i> [ˈpælət]	托盘
sequence	<i>v.</i> [ˈsiːkwəns]	连续; 次序; 相互关联的一组

multitude	<i>n.</i> ['mʌltɪtju:d]	大批、大量、大群
facilitate	<i>v.</i> [fə'sɪlɪteɪt]	使容易、助长
master carton		主箱
slip sheets		滑动板台
container	<i>n.</i> [kən'teɪnə]	集装箱

Sentence Explanations

1. The decision is broader than simply selecting a facility to store inventory since many value-adding activities may be performed during the time products are warehoused. 这个决策要比简单地选择设施存放存货更宽泛，因为许多产品价值增值活动也许会在产品储存期中完成。

2. Examples of such activities are sorting, sequencing, order selection, transportation consolidation, and, in some cases, product modification and assembly. 这些活动包括分拣、排序、订货选择、运输拼箱，有时还包括产品修改和组装。

3. When economists originally discussed supply-and-demand relationships, facility location and transportation cost differentials were assumed either nonexistent or equal among competitors. 当经济学家最初谈论供给和需求的关系时，设施位置和运输费用的差别被假设为不存在或在竞争者中都是一样的。

4. When effectively integrated into an enterprise's logistical operations, warehousing, materials handling, and packaging facilitate the speed and overall ease of product flow throughout the logistical system. 当仓储、货物处理和包装被有效地整合到企业的物流操作中时，它们就会提高产品流转的速度从而使物流系统中的产品流动更加顺畅。

Questions

1. What are the five areas of logistical work?
2. Discuss the reasons why we say the processing of orders is of primary importance.
3. Which area of logistical work has traditionally received considerable managerial attention?

Why?

4. Discuss the three fundamental factors of transportation from the logistical system viewpoint.
5. Discuss the ways to satisfy the transportation requirements.
6. Give some examples of value-adding activities performed during the time products are warehoused.

Reading

Process View of a Supply Chain

A supply chain is a sequence of processes and flows that take place within and between different supply chain stages and combine to fill a customer need for a product.

Cycle View

The processes in a supply chain are divided into a series of cycles, each performed at the interface between two successive stages of a supply chain.

All supply chain processes can be broken into the following four process cycles:

- Customer order cycle
- Replenishment cycle
- Manufacturing cycle
- Procurement cycle

Each cycle occurs at the interface between two successive stages of the supply chain. The five supply chain stages thus result in four supply chain process cycles. Not every supply chain will have all four cycles clearly separated. For example, a grocery supply chain in which a retailer stocks finished-goods inventories and places replenishment orders either with the manufacturer or the distributor is likely to have all four cycles separated. Dell, in contrast, sells directly to customers, thus bypassing the retailer and distributor.

A cycle view of the supply chain is very useful when considering operational decisions, because it clearly specifies the roles and responsibilities of each member of the supply chain. The cycle view provides clarity, for example, when setting up information systems to support supply chain operations, as process ownership and objectives are clearly defined. In the following sections, we describe the various supply chain cycles in greater detail.

Customer Order Cycle

The customer order cycle occurs at the customer/retailer interface and includes all processes directly involved in receiving and filling the customer's order. Typically, the customer initiates this cycle at a retailer site, and the cycle primarily involves filling customer demand. The retailer's interaction with the customer starts when the customer arrives or contact is initiated and ends when the customer receives the order. The processes involved in the customer order cycle are shown in Figure 1.3.2 and include the following:

- Customer arrival
- Customer order entry
- Customer order fulfillment
- Customer order receiving

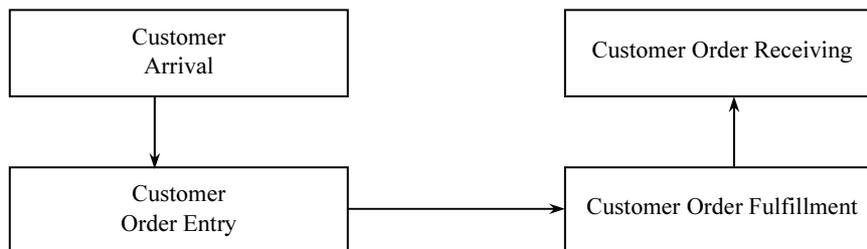


Figure 1.3.2 Customer Order Cycle

Customer Arrival The term customer arrival refers to the customer's arrival at the location where he or she access to his or her choices and makes a decision regarding a purchase. The starting point for supply chain is the arrival of a customer.

- the customer walks into a supermarket to make a purchase,
- the customer calls a mail order telemarketing center, or
- the customer uses the Web or an electronic link to a mail order firm.

From the supply chain perspective, a key goal is to facilitate the contact between the customer and the appropriate product so that the customer's arrival turns into a customer order. At a supermarket, facilitating a customer order may involve managing customer flows and product displays. At a telemarketing center, it may mean ensuring that customers do not have to wait on hold for too long. It may also mean having systems in place so that sales representatives can answer customer queries in a way that turns calls into orders. At a Web site, a key system may be search capabilities with tools such as personalization that allow customers to quickly locate and view products that may interest them. The objective of the customer arrival process is to maximize the conversion of customer arrivals to customer orders.

Customer Order Entry The term customer order entry refers to customers telling the retailer what products they want to purchase and the retailer allocating products to customer. At a supermarket, order entry may take the form of customers loading all items that they intend to purchase onto their market. At a mail order firm's telemarketing center or Web site, order entry will involve customers informing the retailer of the items and quantities they selected. The retailer then allocates the product to the customer order and may also provide a delivery date to the customer. The objective of the customer order entry process is to ensure that the order entry is quick and accurate and is communicated to all other supply chain process that are affected by it.

Customer Order Fulfillment During the customer order fulfillment process, the customer's order is filled and sent to the customer. At a supermarket, the customer performs this process. At a mail order firm this process generally includes picking the order from inventory, packaging it, and shipping it to the customer. All inventories will need to be updated, which may result in the initiation of the replenishment cycle. In general, customer order fulfillment takes place from retail inventory. In a build-to-order scenario, in contrast, order fulfillment takes place directly from the manufacturer's production line. The objective of the customer order fulfillment process is to get the correct and complete orders to customers by the promised due dates and at the lowest possible cost.

Customer Order Receiving During the customer order receiving process, the customer receives the order and takes ownership. Records of this receipt may be updated and cash payment initiated. At a supermarket, receiving occurs at the checkout counter. For a mail order firm, receiving occurs when the product is delivered to the customer.

✈ Notes

Integrated Logistics 整合物流

把从原料供应到成品配送的供应链视为一对一的过程，把所有组成此供应链的组织视为一个整体，而非分别管理个别功能。



1.4 Logistical Operations

Key points: logistical integration; inventory flow; information flow

Difficult points: value-added process

Requirements:

By the end of this lesson, you should be able to

- understand the internal operational scope of integrated logistics operations.
- understand the three logistics operating areas.
- illustrate the two major components of the logistical information.

The internal operational scope of integrated logistics operations is illustrated by the shaded area of Figure 1.4.1. Information from and about customers flows through the enterprise in the form of sales activity, forecasts, and orders. Vital information is refined into specific manufacturing, merchandising, and purchasing plans. As products and materials are procured, a value-added inventory flow is initiated which ultimately results in ownership transfer of finished products to customers. Thus, the process is viewed in terms of two interrelated flows: inventory and information. While internal integrative management is important to success, the firm must also integrate across the supply chain. To be fully effective in today's competitive environment, firms must extend their enterprise integration to incorporate customers and suppliers. This extension reflects the position of logistics in the broader perspective of supply chain management.

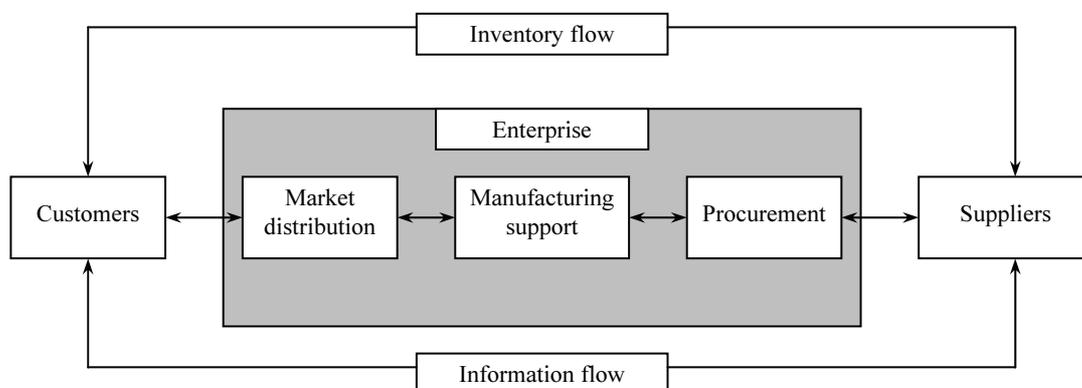


Figure 1.4.1 Logistical Integration

Inventory Flow

The operational management of logistics is concerned with movement and storage of materials and finished products. Logistical operations start with the initial shipment of a material or component part from a supplier and are finalized when a manufactured or processed product is delivered to a customer.

From the initial purchase of a material or component, the logistics process adds value by moving inventory when and where needed. **Providing all goes well, materials and components gain value at each step of their transformation into finished inventory. In other words, an individual part has greater value after it is incorporated into a machine than it had as a part. Likewise, the machine has greater value once it is delivered to a customer.**

To support manufacturing, work-in-process inventory must be properly positioned. The cost of each component and its movement becomes part of the value-added process. For better understanding, it is useful to divide logistical operations into three areas: (1) market distribution, (2) manufacturing support, and (3) procurement.

Market Distribution

The movement of finished product to customers is market distribution. In market distribution, the end customer represents the final destination. The availability of product is a vital part of each channel participant's marketing effort. Even a manufacturer's agent, who typically does not own inventory, must be supported by inventory availability to perform expected marketing responsibilities. Unless a proper assortment of products is efficiently delivered when and where needed, a great deal of the overall marketing effort will be jeopardized. It is through the market distribution process that the timing and geographical placement of inventory become an integral part of marketing. To support the wide variety of marketing systems that exist in a highly commercialized nation, many different market distribution systems are available. All market distribution systems have one common feature: They link manufacturers, wholesalers and retailers into supply chains to provide product availability.

Manufacturing Support

The area of manufacturing support concentrates on managing work-in-process inventory as it flows between stages of manufacturing. The primary logistical responsibility in manufacturing is to participate in formulating a master production schedule and to arrange for its implementation by timely availability of materials, component parts and work-in-process inventory. Thus, the overall concern of manufacturing support is not how production occurs but rather what, when, and where products will be manufactured.

Manufacturing support is significantly different from market distribution. Market distribution attempts to service the desires of customers and therefore must accommodate the uncertainty of consumer and industrial demand. Manufacturing support involves movement requirements that are under the control of the manufacturing enterprise. The uncertainties introduced by random customer ordering and erratic demand that market distribution must accommodate are not typical in manufacturing operations. **From the viewpoint of overall planning, the separation of manufacturing support from outbound market distribution and inbound procurement**

activities provides opportunities for specialization and improved efficiency. The degree to which a firm adopts a response strategy serves to reduce or eliminate the separation of manufacturing.

Procurement

Procurement is concerned with purchasing and arranging inbound movement of materials, parts and/or finished inventory from suppliers to manufacturing or assembly plants, warehouses or retail stores. Depending on the situation, the acquisition process is commonly identified by different names. In manufacturing, the process of acquisition is typically called purchasing. In government circles, acquisition has traditionally been referred to as procurement. In retailing and wholesaling, buying is the most widely used term. In many circles, the process is referred to as inbound logistics. For the purposes of this text, the term procurement will include all types of purchasing. The term material is used to identify inventory moving inbound to an enterprise, regardless of its degree of readiness for resale. The term product is used to identify inventory that is available for consumer purchase. **In other words, materials are involved in the process of adding value through manufacturing whereas products are ready for consumption. The fundamental distinction is that products result from the value added to material during manufacture, sortation, or assembly.**

Within a typical enterprise, the three logistics operating areas overlap. Viewing each as an integral part of the overall value-adding process creates an opportunity to capitalize on the unique attributes of each within the overall process. The overall challenge of a supply chain is to integrate the logistical processes of participating firms in a manner that facilitates overall efficiency.

New Words And Terms

finalize	v. ['faɪnəlaɪz]	落实、定下来、使定案
destination	n. [destɪ'neɪʃən]	目的地、终点；目标
jeopardize	v. ['dʒepədaɪz]	危及
acquisition	n. [ækwi'zɪʃn]	获得、得到
overlap	v. [əʊvə'læp]	与...交搭；重叠
attribute	n. ['ætrɪbjʊ:t]	属性
reconcile	v. ['rekənsaɪl]	使和好；调停
parallel	a. ['pærəlel]	平行的；相同的
facilitate	v. [fə'sɪlɪteɪt]	使容易、助长
framework	n. ['freɪmwɜ:k]	框架、构架、结构
coordinate	v. [kəʊ'ɒdɪneɪt]	使协调、调节
via	prep. ['vaɪə]	经过、通过
constraint	n. [kən'streɪnt]	强迫、结束；强制力
deploy	v. [dɪ'plɔɪ]	使开始活动或工作
duplicate	v. ['dʒu:plɪkɪt]	复制

redundant	<i>a.</i> [ri'dʌndənt]	过多的、冗长的、多余的
initiative	<i>n.</i> [i'nɪʃiətɪv]	第一步
radically	<i>adv.</i> ['rædɪkəli]	急剧地
documentation	<i>n.</i> [ˌdɒkjumən'teɪʃn]	提供文件
release	<i>v.</i> [ri'li:s]	释放；放松；发表
synchronization	<i>n.</i> [ˌsɪŋkrənaɪ'zeɪʃn]	同步、同时进行

Sentence Explanations

1. Providing all goes well, materials and components gain value at each step of their transformation into finished inventory. In other words, an individual part has greater value after it is incorporated into a machine than it had as a part. Likewise, the machine has greater value once it is delivered to a customer. 如果运作很好的话，原料和零部件在转变为最终存货的每一步都会获得价值。换句话说，一个单独的零件在组装进入机器之后要比作为零件的价值要高。同样地，机器一旦递交给顾客就拥有更高的价值。

2. From the viewpoint of overall planning, the separation of manufacturing support from outbound market distribution and inbound procurement activities provides opportunities for specialization and improved efficiency. 从全面计划的观点看，生产支持把外部市场分销和内部采购活动分离，为专业化和提高效率提供了机会。

3. In other words, materials are involved in the process of adding value through manufacturing whereas products are ready for consumption. The fundamental distinction is that products result from the value added to material during manufacture, sortation, or assembly. 换句话说，原材料是需要生产过程中增值的，而产品是消费者将要消费的。基本的差别是产品是原材料经过生产、分类或组装取得的价值增值形式。

Questions

1. Discuss why the firms extend their enterprise integration to incorporate customers and suppliers.
2. Describe Figure 1.4.1 Logistical Integration.
3. Explain the logistical operations in your words.
4. Discuss the ways to add value in each area of the logistical operations.
5. Explain the common features that the market distribution systems have in your words.
6. Discuss the differences between market distribution and manufacturing support.
7. What is procurement?
8. What is the role of procurement in the logistical operations?

Reading

Information Flow

Information flow identifies specific locations within a logistical system that have requirements. Information also integrates the three operating areas. Within individual logistics areas, different movement requirements exist with respect to size of order availability of inventory, and urgency of movement. The primary objective of information flow management is to reconcile these differentials to improve overall supply chain performance. It is important to stress that information requirements parallel the actual work performed in market distribution, manufacturing support, and procurement. Whereas these areas contain the actual logistics work, information facilitates coordination of planning and control of day-to-day operations. Without accurate information the effort involved in the logistical system can be wasted.

Logistical information has two major components: planning/coordination and operations. The interrelationship of the two types of logistical information is illustrated in Figure 1.4.2. The objective here is to introduce the framework that details information needed to manage integrated logistics.

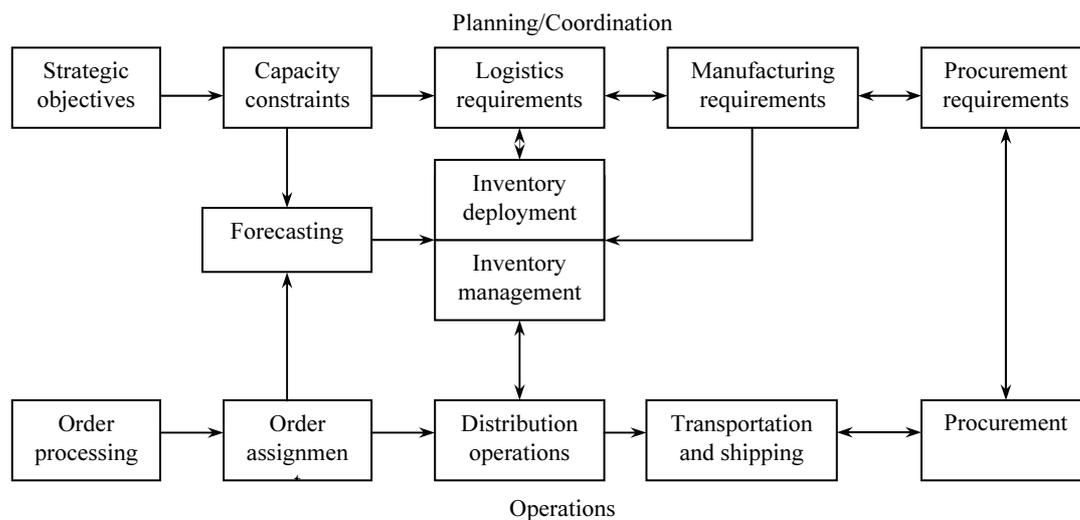


Figure 1.4.2 Logistics Information Requirements

1. Planning/Coordination

The overall purpose of planning/coordination is to identify required operational information and to facilitate supply chain integration via (1) strategic objectives, (2) capacity constraints, (3) logistical requirements, (4) inventory deployment, (5) manufacturing requirements, (6) procurement requirements, and (7) forecasting. Unless a high level of planning/coordination is achieved, the potential exists for operating inefficiencies and excessive inventory. The challenge is to achieve such planning/coordination across the range of firms participating in a supply chain to reduce duplication and unneeded redundancy.

The primary drivers of supply chain operations are **strategic objectives** derived from marketing

and financial goals. These initiatives detail the nature and location of customers that supply chain operations seeks to match to the planned products and services. The financial aspects of strategic plans detail resources required to support inventory, receivables, facilities, equipment, and capacity.

Capacity constraints identify internal and external manufacturing and market distribution limitations. Given strategic objectives, capacity constraints identify limitations, barriers, or bottlenecks within manufacturing and distribution facilities. It also helps identify when specific manufacturing or distribution work should be outsourced. To illustrate, whereas Kellogg owns the brand and distributes *Cracklin' Oat Bran*, all manufacturing is performed by a third party on a contract basis. The output of capacity constraint planning is time-phased objectives that detail and schedule facility utilization, financial resources, and human requirements.

Using inputs from forecasting, promotional scheduling, customer orders, and inventory status, **logistical requirements** identify the specific work facilities, equipment, and labor forces required to support the strategic plan.

Inventory deployment interfaces with inventory management between planning/coordination and operations. The deployment plan details the timing of where inventory will be positioned to efficiently move inventory through the supply chain. From an information perspective, deployment specifies the what, where, and when for the logistics processes. From an operational viewpoint, inventory management is performed on a day-to-day basis.

In production situations, **manufacturing requirements** determine planned schedules. The traditional deliverable is a statement of time-phased inventory requirements that is used to drive Master Production Scheduling (MPS) and Manufacturing Requirements Planning (MRP). In situations characterized by a high degree of responsiveness, Advance Planning Systems (APS) are more commonly used to time-phase manufacturing.

Procurement requirements represent a time-sequenced schedule of material and components needed to support manufacturing requirements. In retailing and wholesaling establishments, purchasing determines inbound merchandise. In manufacturing situations, procurement arranges for arrival of materials and component parts from suppliers. Regardless of the business situation, purchasing information is used to coordinate decisions concerning supplier qualifications, degree of desired speculation, third-party arrangements, and feasibility of long-term contracting.

Forecasting utilizes historical data, current activity levels, and planning assumptions to predict future activity levels. Logistical forecasting is generally concerned with relatively short-term predictions. Typical forecast horizons are from 30 to 90 days. The forecast challenge is to quantify expected sales for specific products. These forecasts form the basis of logistics requirement and operating plans.

2. Operations

A second purpose of accurate and timely information is to facilitate logistical operations. To satisfy supply chain requirements, logistics must receive, process, and ship inventory. Operational information is required in six related areas: (1) order processing, (2) order assignment, (3) distribution operations, (4) inventory management, (5) transportation and shipping, and (6) procurement. These areas of information facilitate the areas of logistical work.

Order processing refers to the exchange of requirements information between supply chain members involved in product distribution. The primary activity of order management is accurate entry and qualification of customer orders. Information technology has radically changed the traditional process of order management.

Order assignment identifies inventory and organizational responsibility to satisfy customer requirements. The traditional approach has been to assign responsibility or planned manufacturing to customers according to predetermined priorities. In technology-rich order processing systems, two-way communication linkage can be maintained with customers to generate a negotiated order that satisfies customers within the constraints of planned logistical operations.

Distribution operations involve information to facilitate and coordinate work within logistics facilities. Emphasis is placed on scheduling availability of the desired inventory assortment with minimal duplication and redundant work effort. The key to distribution operations is to store and handle specific inventory as little as possible while still meeting customer order requirements.

Inventory management is concerned with information required to implement the logistics plan. Using a combination of human resources and information technology inventory is deployed and then managed to satisfy planned requirements. The work of inventory management is to make sure that the overall logistical system has appropriate resources to perform as planned.

Transportation and **shipping** information directs inventory movement. In distribution operations, it is important to consolidate orders so as to fully utilize transportation capacity. It is also necessary to ensure that the required transportation equipment is available when needed. Finally, because ownership transfer often results from transportation, supporting transaction documentation is required.

Procurement is concerned with the information necessary to complete purchase order preparation, modification, and release while ensuring overall supplier compliance. In many ways information related to procurement is similar to that involved in order processing. Both forms of information exchange serve to facilitate operations that link a firm with its customers and suppliers.

The overall purpose of operational information is to facilitate integrated management of market distribution, manufacturing support, and procurement operations. Planning/coordination identifies and prioritizes required work and identifies operational information needed to perform the day-to-day logistics. The dynamics of supply chain synchronization is discussed next.

➔ Notes

Procurement 采购

公司以合理的价格从供应商获得适当物品或服务的有关活动，包括选择供应厂商、价格、条件、下订单、收货和验收等。亦称供应管理。比单纯的购买（purchasing）所包括的范围大。