



物流与供应链管理系列

供应链管理概论

物流视角 (第2版)

Supply Chain Management

An Introduction to Logistics

(2nd Edition)

(英文 · 注释版)

(加) 唐纳德·沃特斯 著

高咏玲 译注



电子工业出版社

PUBLISHING HOUSE OF ELECTRONICS INDUSTRY

<http://www.phei.com.cn>

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Publishing House of Electronics Industry
北京·BEIJING

Donald Waters: Supply Chain Management: An Introduction to Logistics, 2nd Edition.

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版权贸易合同登记号 图字：01-2009-5329

图书在版编目 (CIP) 数据

供应链管理概论：物流视角：第2版：Supply Chain Management: An Introduction to Logistics, 2e: 英文/ (加) 沃特斯 (Waters, D.) 著；高咏玲译注. —北京：电子工业出版社，2011.1
(物流与供应链管理系列)

ISBN 978-7-121-11841-8

I. ①供… II. ①沃… ②高… III. ①物资供应—物资管理—英文 IV. ①F252

中国版本图书馆 CIP 数据核字 (2010) 第 206385 号

责任编辑：刘露明

印刷：北京丰源印刷厂

装订：三河市鹏成印业有限公司

出版发行：电子工业出版社

北京市海淀区万寿路 173 信箱 邮编 100036

开本：787×1092 1/16 印张：26.25 字数：630 千字

印次：2011 年 1 月第 1 次印刷

定价：46.00 元

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前 言

Preface

这是一本关于物流管理与供应链管理的教材，它描述了物料从供应商经诸多环节到达最终客户的过程。在本书中，我们广义地来看待物流，考察各种组织和各种物料的移动。不但介绍了制造厂商怎样移动有形的物料，还介绍了服务行业通过它们无形的服务来移动物料。

每个组织都需要可靠的物料流动。物流是一项负责所有物料移动的基本职能，最好以整合的功能进行组织，因为它对客户服务、成本和其他绩效评估指标有着深远的影响。

供应链并不局限在一个组织内，它处于连接外部的供应商和客户的独特地位。组织日渐意识到，它们并不是孤立地运营，而是作为满足客户的整条供应链的一部分。

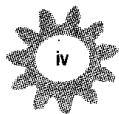
物流是一个快速发展的领域。运营、通信和技术的发展、全球化市场和日益提高的客户服务及其他方面对物流提出了新的要求。本书以最新的视角介绍供应链管理，介绍了如何响应这些需求。

■ 本书的学习方法

本书为初学者奠定了深入和全面的基础，适用于学习商科的学生、需要了解某方面物流知识的专业人员、想要深入了解核心管理领域的管理者。本书涉及物流的范围很广，涵盖了所有的主要理念。对于一门课程来说，本书不但以足够的深度讨论了各个主题，而且没拘泥于过多的细节。本书集中讲述重点问题，篇幅合理。

本书有以下特色：

- 作为一本介绍性教科书，本书不需要物流和管理知识基础；
- 适合多种类型的学生或自学者；
- 视野宽广，覆盖各种类型的组织；
- 把物流置于它的战略内容之内；
- 介绍了大量的物流流动，重点在于实际操作中可能遇到的问题；
- 以合理的顺序展开内容；



- 实用性强，以简单易懂的方式阐述各种观点，避免了抽象的讨论；
- 以跨国组织为实例来解释各种原理；
- 每章包括物流实践、工作案例、案例研究，还有思考题、讨论题等强化内容；
- 表达清晰，以简洁易懂的方式阐述各种思想。

■ 内容

本书以逻辑顺序介绍供应链管理者需要做出的主要决策。显然，所有的主題都是相关的，管理者需要同时而不是依次做出决策。本书直叙了物料通过复杂的网络移动的历程。为此，将内容分为3个部分。

第1部分对物流进行了整体的介绍，定义了主要术语，论述了物流的地位、目的、重要性、趋势和供应链管理的大致内容。

第2部分探讨了供应链规划。此部分以制定物流战略开始，然后论述如何执行物流战略，介绍了物流是如何成为一项遍布全球的整合的职能的。其中涉及一些重要的决策包括供应链的结构和设施的选址、数量和规模等。

第3部分介绍了物料是如何沿着供应链移动的。该部分由讨论物料控制开始，然后着眼于一些具体的活动包括采购、库存管理、仓储、物料管理和运输。物流管理者一直寻求改进这些活动的方法，却往往处在供应链风险渐增的环境中。本书的第3部分重点讨论物流的一些特殊功能，包括采购、库存管理、仓储和物料搬运及国际物流。

这三个部分介绍了所有组织要做出的一些最重要的决策，包括：

- 物流的战略重要性。
- 全球化和越来越多的国际竞争。
- 供应链的合作和整合。
- 新需求引发的物流趋势。
- 电子商务带来的新需求。
- 新技术和通信的使用。
- 越来越强调质量和客户服务。
- 环境问题。
- 更关注供应链风险管理。

■ 第2版的变化

自本书的第1版出版以来，物流和供应链管理领域发展迅速，因此，本书的第2版全部重写和更新了第1版的内容，加入了新资料、新的物流实例、新的学习功能和参考文献并扩展了其他资料。同时，删除了第1版中一些相关不够紧密的内容。

本书每章采用相同的结构，包括本章目标、物流实践、工作案例、本章回顾案例研究和讨论题等。

目 录

Contents

第 1 部分 供应链管理概论

1 物流与供应链	2
物流的作用	3
供应链	7
物流目的	13
物流活动	17
物流的重要性	21
2 物流的发展	29
早期的物流	30
改进物流的压力	30
客户满意	34
改进的沟通	40
响应商业环境的变化	47
新的物流运作方式	49

第 2 部分 建立高效的供应链

3 物流战略	56
决策的层次	57
物流的战略地位	59
物流战略的内容	61
设计物流战略	63
物流战略的重点	66
精益战略和敏捷战略	69
其他战略	75

4 战略实施	83
与低层决策相关的战略	84
战略决策的领域	89
物流的基础设施	90
供应链的结构	99
5 供应链整合	110
分散的物流带来的问题	111
整合物流活动	114
整合供应链	118
实现整合	124
合作的类型	126
6 全球物流	136
国际贸易	137
组织国际贸易	144
全球运营	147
国际贸易的分布	152
国际物流的问题	157
7 设施选址	165
区位决策	166
决策的层次	170
选择地区	172
定位的模式	177
可行性定位法	179
网络模型	187



8	能力计划	195	12	仓储和物料搬运	316
	战略计划	196		仓储的目的	317
	规划能力	199		仓库里的活动	319
	调整能力	209		物料搬运	323
	能力的系统性变化	214		包装	329
	相关的计划	219	13	运输	335
第3部分 供应链中的物料移动				运输的特点	336
9	物料流动控制	228		运输方式	340
	传统的计划	229		多式联运	352
	物料需求计划	233		运输所有权	355
	准时制原则	241		相关服务	357
	沿供应链扩展准时制	251		生产率问题	360
10	采购	257	14	绩效评估与提高	366
	购买与采购	258		绩效评估的一般指标	367
	采购活动	262		物流评价的具体指标	375
	供应商的选择	265		比较绩效	381
	采购步骤	271		提高绩效	385
	购买的类型	280	15	供应链风险	391
11	库存管理	288		风险的定义	392
	持有存货的原因	289		风险管理	394
	持有库存的成本	294		日益增加的供应链风险	402
	经济订购批量	298		风险管理的发展	408
	不确定需求和安全库存	302			
	定期盘存系统	305			
	ABC 分析	309			



PART I

An overview of supply chain management

供应链管理概论

This book gives a comprehensive review of logistics. It shows how managers control the movement and storage of products on their journey from original suppliers through to final customers.

The book is divided into three parts. The first part introduces the broad concept of supply chain management. It defines some key terms and discusses ideas that are developed in the rest of the book. The second part of the book considers the design of supply chains, and the third part describes the activities needed to move materials along the chains.

There are two chapters in this first part:

- Chapter 1 reviews the broad context of logistics and defines some key terms. It discusses the role of supply chain management, its aims, importance and key activities.
- Chapter 2 shows how logistics has evolved from a series of isolated activities into a single, integrated function. It is an area where ideas are changing quickly, so the chapter considers some current trends.

LOGISTICS AND SUPPLY CHAINS

物流与供应链

LEARNING OBJECTIVES 本章目标

After reading this chapter you should be able to:

- understand the broad role of logistics
掌握物流的广泛作用。
- see how logistics support the operations of an organisation
理解物流是如何支持企业运作的。
- describe the role and structure of supply chains
描述供应链的作用和结构。
- discuss the overall aims of logistics
讨论物流的总体目标。
- understand how logistics contribute to organisational performance
掌握物流对企业绩效的贡献。
- appreciate the balance between customer service and costs
理解物流成本与客户服务水平之间的平衡。
- list the activities within logistics and understand the relationships between them
区分物流的各项活动并掌握它们之间的关系。
- recognise the importance of logistics to every organisation.
了解物流在各类企业部门中的重要性。



Role of logistics 物流的作用

Every organisation has to move materials. Manufacturers have factories that collect raw materials from suppliers and deliver finished goods to customers; retail shops have deliveries from wholesalers; a television news service collects reports from around the world and delivers them to viewers. Most of us live in towns and cities and eat food brought in from the country. When you order books from a website, a courier delivers them to your door, and when you buy a mobile phone it has probably travelled around the world to reach you. Every time you buy, rent, lease, hire or borrow anything at all, someone has to collect it and deliver it to your door. Logistics is the function responsible for this movement.

- **Logistics** is the function responsible for all aspects of the movement and storage of materials on their journey from original suppliers through to final customers.

On a national scale, logistics needs a huge amount of effort. China has become ‘the factory of the world’ and exports US\$100 billion of goods a month, while the internal trade of goods within the European Union (EU) is worth more than US\$2 trillion a year – and all of this has to be moved between strings of suppliers and customers. A rule of thumb says that logistics accounts for 10–20% of gross domestic product (GDP), so the USA’s GDP of US\$13 trillion might include US\$2 trillion for logistics. The 30 members of the Organisation for Economic Co-operation and Development (OECD) have a combined GDP of US\$40 trillion and might spend US\$6 trillion on logistics.

Despite this effort, we hardly notice logistics as it goes about its business – but sometimes you might notice the lorries driving down a motorway, visit a shopping mall, drive through a trading estate, see a container ship unloading, fly from an airport, or have a parcel delivered by a courier service. These are the visible signs of a huge industry that employs millions of people and costs billions of dollars a year. In this book, we describe this complex function, seeing exactly what it involves and how it can be managed.

Logistics support operations 支持生产经营

Every organisation delivers products to its customers. Traditionally, these products are described as either goods or services. Then manufacturers like Sony, Ford and Guinness make tangible goods, while the BBC, Qantas and Vodafone provide intangible services. But this view is misleading, and it is more realistic to describe every product as a complex package that contains a mixture of both goods and service. For example, Toyota manufactures cars, but they also give services through warranties, after-sales guarantees, repairs and finance packages. McDonald’s provides a combination of goods (burgers, cutlery, packaging, etc.)

Logistics
the function responsible for all aspects of the movement and storage of materials on their journey from original suppliers through to final customers¹

1. 物流是一种职能，它包括了从供应商到企业的原料配送、企业内部的物料转移，以及把产品送到客户手里的所有活动。

Product
the combination of goods and services that an organisation supplies to its customers²

2. 企业供应给客户的产品都是商品和服务的混合体。

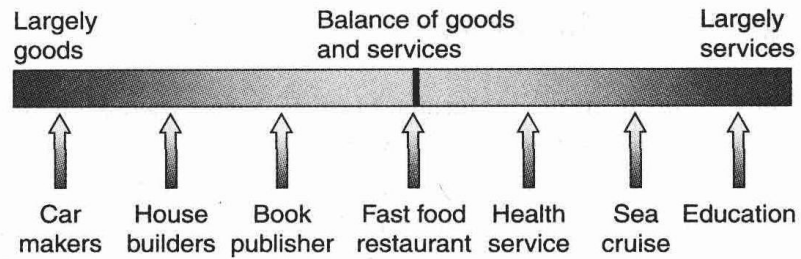


Figure 1.1 Spectrum of products

Product package

view of a product as a complex mixture of goods and services, including logistics³

3. 产品包装可视为包括物流在内的服务和商品的组合。

Operations

all the activities that create an organisation's products

4. 企业的核心功能是生产，生产活动创造了产品，把各种投入转化为期望的产出。

Inbound or inward logistics

move materials into an organisation from suppliers⁵

5. 输入物流是指把物料从供应商送到企业的活动。

Outbound or outward logistics

move materials from an organisation out to customers⁶

6. 输出物流是指把物料从企业送到客户的活动。

and services (when they prepare food, sell it and clean the restaurant). Then we can describe a product package as lying on the spectrum (shown in Figure 1.1). At one end of this spectrum are products that are predominantly goods, such as cars, domestic appliances, clothes and furniture; at the other end are products that are predominantly services, such as insurance, banking, education and telephone services. In the middle are products with a more even balance, such as restaurant meals, hospitals and some websites.

At the heart of an organisation are the operations that create and deliver the products. These operations take a variety of inputs and convert them into desired outputs⁴, as shown in Figure 1.2. The inputs include raw materials, components, people, equipment, information, money and other resources. Operations are the manufacturing, serving, transporting, selling, training, and so on. The main outputs are goods and services. For instance, The Golden Lion restaurant takes inputs of food, chefs, kitchen, waiters and dining area; its operations include food preparation, cooking and serving; the main outputs are meals, service, customer satisfaction, and so on.

Logistics manages the flow of inputs from suppliers, the movement of materials through different operations within the organisation, and the flow of materials out to customers (as shown in Figure 1.3).

Moving materials into the organisation from suppliers is called inbound or inward logistics; moving materials out to customers is outbound or outward

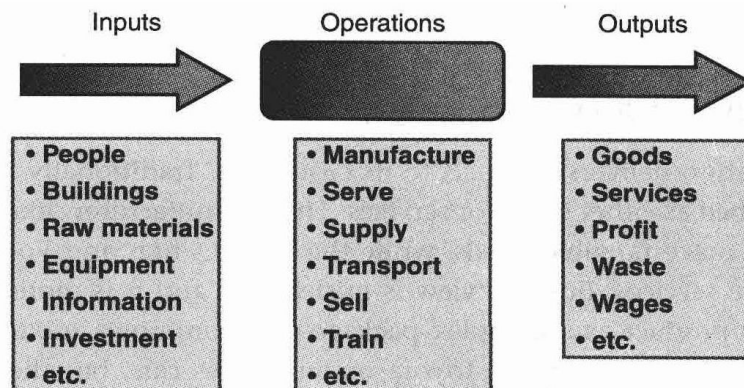


Figure 1.2 Operations transform inputs to desired outputs

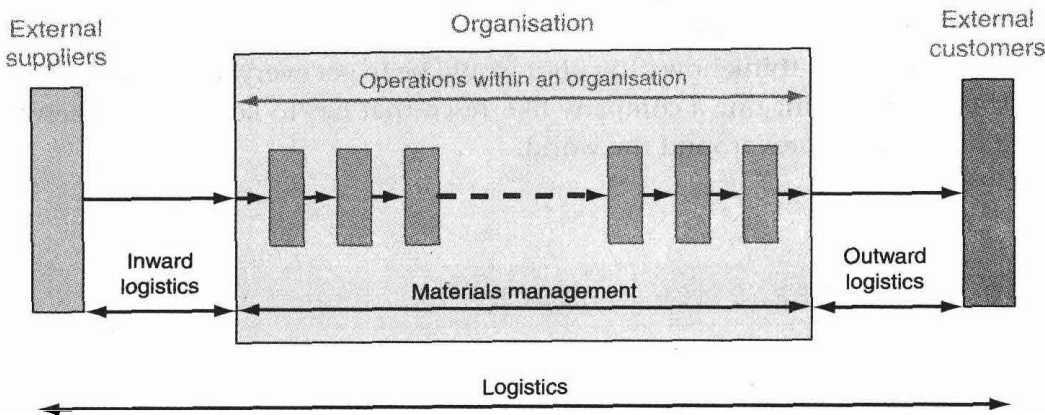


Figure 1.3 The flow of materials controlled by logistics

logistics; moving materials within the organisation (often described as collecting from internal suppliers and delivering to internal customers) is materials management.

Materials 物料

We have outlined the role of logistics in moving materials – but what exactly do we mean by materials? Sometimes this is obvious, for example, when a power station brings coal from a mine, a farmer takes potatoes to a market, or a computer manufacturer delivers PCs to a warehouse. With tangible goods it is easy to see the role of logistics, and even organisations providing the most intangible services move some goods around (perhaps paperwork or consumables).

Often the flow of materials is less clear, for example, when a television company delivers entertainment to its viewers, a telephone company provides a communications service, an internet service provider (ISP) gives access to the Web, or a research company creates knowledge. A broad view of materials also includes these intangibles. Then logistics is responsible for moving both tangible goods and intangible services – and this might include materials, components, finished products, people, information, paperwork, messages, knowledge, consumables, energy, money, and anything else needed by operations. A television company uses logistics to transmit programmes to customers, in the same way that an oil company uses logistics to deliver petrol. The clear message is that every organisation moves materials, and for this it needs logistics.

Materials management controls the movement of materials within an organisation⁷

7. 在企业内物料的转移活动则称之为物料管理。

Materials anything that is moved into, through, or out of an organisation

To summarise:

- A **product** is the mixture of goods and services that an organisation passes to its customers.
- **Materials** are all the things needed to make a product, and these can be both tangible (such as raw materials) and intangible (such as information).⁸
- **Logistics** is responsible for moving and storing all the materials.

8. 物料就是企业为生产产品所需运送的所有物质材料，包括有形的（如原材料），也包括无形的（如信息等）。



It can be difficult to imagine the effort put into logistics, but next time you go into a supermarket, think how difficult it would be to get everything delivered to the shelves. Then imagine a company like Tesco that has to keep all the shelves filled in its 4000 stores around the world.

LOGISTICS IN PRACTICE – TESCO

Tesco is one of the world's leading retailers, with more than 4000 stores and sales of £50 billion a year. They have a long-term strategy of continuing growth, based on their aspiration to: 'Strive every day to do the best we can for our customers.' For this they concentrate on four areas – growth in the core UK business, strong international expansion, to be as strong in non-foods as in foods, and to follow customers into new retailing services.

To support its operations it has a huge, efficient logistics network that spans the world. This continually evolves to meet changing customer demands, 'Following the customer – as customers' shopping habits change, we change and respond by providing new products and services.' You can see this effect in their UK stores. In the 1970s most of Tesco's sales were in fairly small supermarkets in town centres. Over the next 20 years they closed many of these smaller stores to focus on larger, out-of-town developments. More recently, they added smaller Express and Metro formats, so by 2008 they had 2.5 million square metres of sales area with four main formats to meet varying needs:

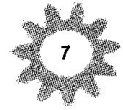
- 150 Extras with more than 6000 square metres and selling a complete range of household products
- 450 Superstores with 2000–5000 square metres and focusing on food
- 200 Metro stores with 700–1500 square metres selling a smaller range of food and ready meals
- 550 Express stores with up to 300 square metres giving a local service of 7000 lines.

The food range continues to expand, adding own brand, 'Finest', 'organic', 'fair trade', 'Healthy Living', 'Free From', and so on. Alongside food, the company now sells household goods – and continues its diversification into finance, insurance, telephone and Internet services, petrol stations, pharmacies, healthcare, and so on. Operations within the stores have also changed, with the growth of 24-hour opening, self-service checkouts, shelf-ready packaging, Clubcard and on-line shopping. Tesco has moved heavily into e-commerce, which has transformed many aspects of their logistics, including a web-based home delivery service with sales of more than a billion pounds a year.

Question

- What do you think that Tesco's logistics tries to achieve? What are likely to be the main problems?

(Source: Company annual reports and website www.tesco.com)



Supply chains 供应链

So far we have described the movement of materials through a single organisation. But no organisation works in isolation, and each one acts as a customer when it buys materials from its own suppliers, and then it acts as a supplier when it delivers materials to its own customers. For instance, a wholesaler acts as a customer when buying goods from manufacturers, and then as a supplier when selling goods to retailers. A manufacturer buys raw materials from suppliers, assembles these into finished products, and sells them to wholesalers. As a result, most products move through a series of organisations as they travel between original suppliers and final customers. Milk moves through a farm, tanker collection, dairy, bottling plant, distributor and supermarket before we buy it. A toothbrush starts its journey with a company extracting crude oil, and then it passes through pipelines, refineries, chemical works, plastics companies, manufacturers, importers, wholesalers and retailers before finishing in your bathroom. A sheet of paper moves through a string of organisations before it reaches your desk (illustrated in Figure 1.4).

People use different names for these chains of activities and organisations. When they emphasise the operations, they refer to the process; when they emphasise marketing, they call it a logistics channel; when they look at the value added, they call it a value chain; when they see how customer demands

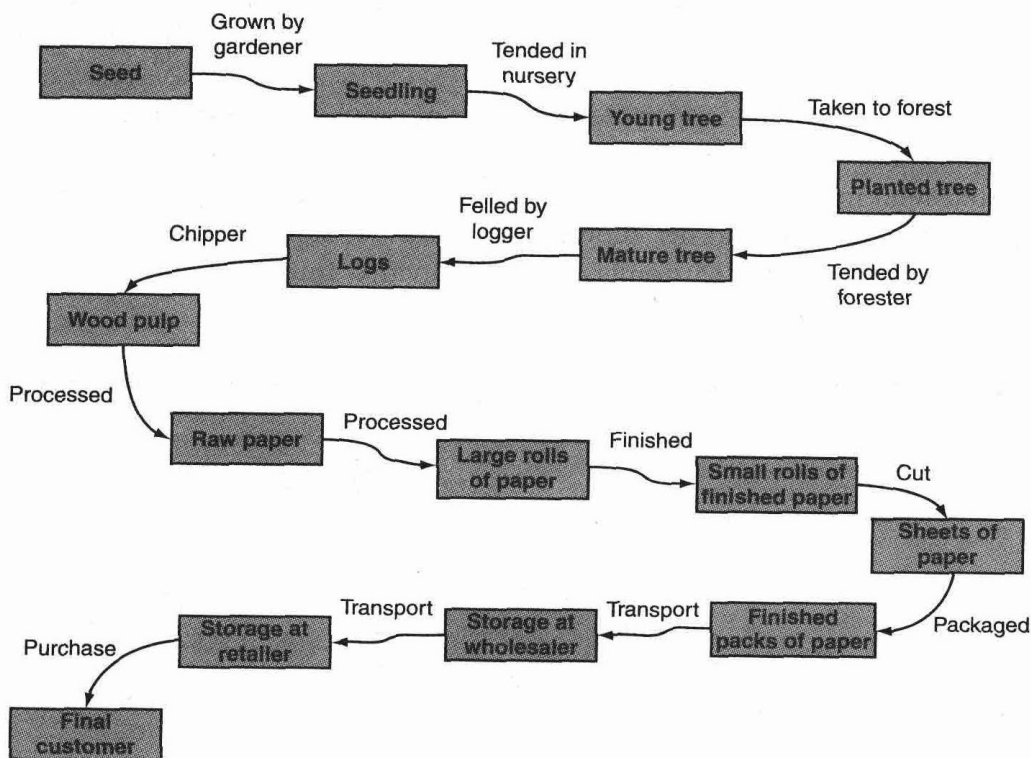


Figure 1.4 Outline of the supply chain for paper

**Supply chain**

consists of the series of activities and organisations that materials move through on their journey from initial suppliers to final customers⁹

9. 供应链涉及一系列相关活动及企业，涵盖了从最初的供应商采购原材料到将产品和服务交付给最终消费者的全过程。

are satisfied, they call it a demand chain. Here we are emphasising the movement of materials and use the most common term of supply chain.

- A supply chain consists of the series of activities and organisations that materials move through on their journey from initial suppliers to final customers.

Basic structure 基本结构

Every product has its own unique supply chain, and this can be both long and complicated. A supply chain in Cadbury starts with cocoa beans growing on farms and ends when hungry customers buy bars of chocolate. A supply chain for Levi jeans starts with someone growing a field of cotton and ends when you buy them in a shop. The supply chain describes the total journey of materials as they move 'from dirt to dirt'. Along this journey, materials may move through farmers, miners, processors, raw materials suppliers, agents, component makers, manufacturers, assemblers, finishers, packers, logistics centres, warehouses, third-party operators, transport companies, wholesalers, retailers, and a whole range of other operations.

The simplest view of a supply chain has a single product moving through a series of organisations, each of which somehow adds value to the product. Taking one organisation's point of view, activities in front of it (moving materials inwards) are called upstream;¹⁰ those after the organisation (moving materials outwards) are called downstream.¹¹

The upstream activities are divided into tiers of suppliers (shown in Figure 1.5). A supplier that sends materials directly to the operations is a first-tier supplier; one that send materials to a first-tier supplier is a second-tier supplier; one that sends materials to second-tier supplier is a third-tier supplier, and so on back to the original sources. Customers are also divided into tiers. One that gets

Upstream

in front of an organisation and moving materials inwards from original suppliers

10. 对于供应链中的企业来说，在它输入物料之前的活动，称之为上游。

Downstream

after an organisation and moving materials outwards to final customers

11. 在该企业输出物料之后的活动，称之为下游。

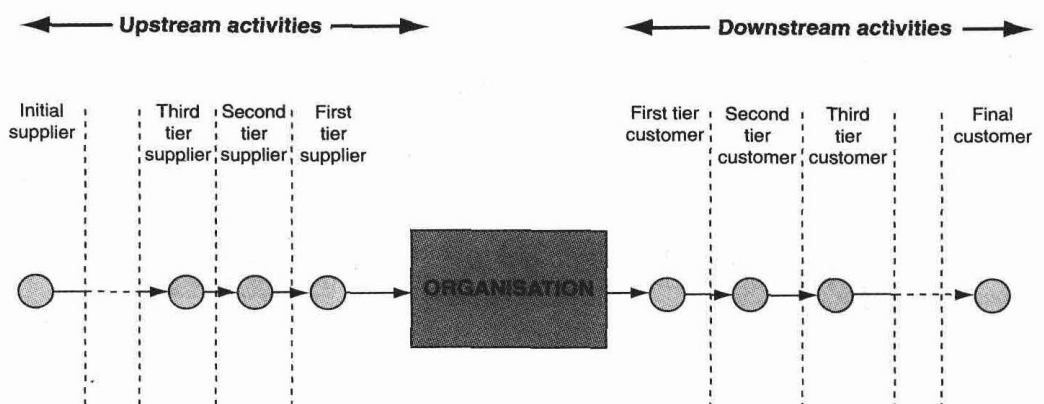


Figure 1.5 Activities in a simple supply chain



a product directly from the operations is a first-tier customer; one that gets a product from a first-tier customer is a second-tier customer; one that gets a product from a second-tier customer is a third-tier customer, and so on to the final customers.

This view of a supply chain seems reasonable, but you soon meet problems with the definition of boundaries. For instance, the supply chain for bread starts with wheat growing in a field. But the grain farmer might buy seed from a merchant, who in turn buys electricity to power their facilities – and you could extend the chain backwards almost endlessly. In the same way, there may not be a clear end to the chain, as logistics is increasingly seen as extending beyond the final customer to include the eventual disposal of products. For instance, the European Waste Electrical and Electronic Equipment (WEEE) Directive became law in 2003 and sets collection, recycling and recovery targets for all types of electrical goods. In particular, it says that suppliers should have some responsibility for eventual disposal of their products so that, ‘Users of electrical and electronic equipment from private households should have the possibility of returning WEEE at least free of charge.’ The broad calls to ‘reduce, reuse and recycle’ mean that logistics is increasingly concerned with the collection and return of materials as well as with its original delivery.

The boundaries around a supply chain are rather fuzzy and we have to draw an arbitrary line to define our primary interest, and say that anything outside this is of secondary interest. But there is another complication as our linear model of a simple series of organisations is not really accurate. Virtually every organisation gets materials from many different suppliers and sells products to many different customers. So each sees supply chains converging on its operations as raw materials move in through the tiers of suppliers, and then diverging as products move out through tiers of customers. For instance, a manufacturer might see sub-assembly works as first-tier suppliers, component makers as second-tier suppliers, material suppliers as third-tier suppliers; and it might see wholesalers as first-tier customers, retailers as second-tier customers, and end-users as third-tier customers (as illustrated in Figure 1.6).

Most supply chains follow this general pattern, but each product has its own unique chain and they come in a huge variety of different shapes and sizes!¹² An everyday object like a shirt or blouse has a long journey from the farm growing cotton through to the final customer – and it also has different chains merging as buttons, polyester, dyes, packaging and other materials join the main process. When you buy a computer, many upstream strands merge as Intel provide the processor, Matshita the DVD drive, Agfa the scanner, Hewlett-Packard the printer, Microsoft the operating system, and so on.

After the operations, parallel marketing channels mean that supply chains also diverge into separate downstream strands, with the same product following different routes to different types of customer. For instance, car component makers

12. 多数的供应链都遵循这一模式，但每种产品都有其独特的供应链，因而形成各种不同规模和形状的供应链。

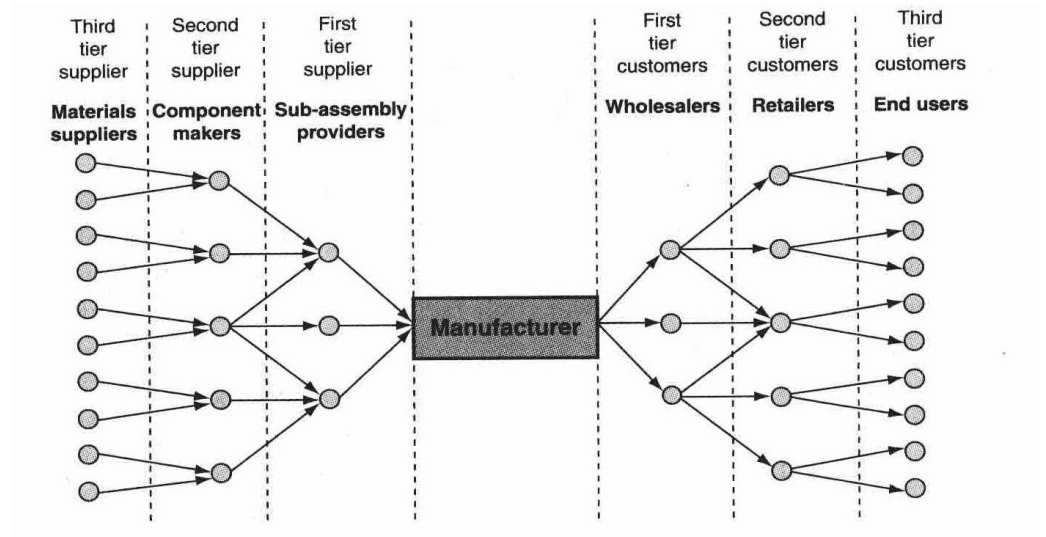


Figure 1.6 Typical supply chain around a manufacturer

sell to car assembly plants, wholesalers, garages, retail shops, car owners, and anyone else interested in buying their products.

LOGISTICS IN PRACTICE – LISTERINE'S SUPPLY CHAIN

Listerine was first formulated in 1879 as a surgical antiseptic, and has been used by dentists for oral care since 1895. In 1914 it became the first over-the-counter antiseptic mouthwash. The original formula has a notoriously strong flavour, but it was almost 80 years before new variations were introduced. Then in 1992 Cool Mint Listerine was introduced, followed by FreshBurst in 2003 – and now there are eight different versions, marketed under the slogan 'Kills germs that cause bad breath'.

The ownership of Listerine has changed several times. Most recently it was owned by Pfizer's consumer healthcare division until this was taken over by Johnson and Johnson in December 2006.

We can summarise the main elements in Listerine's supply chain as follows (illustrated in Figure 1.7):

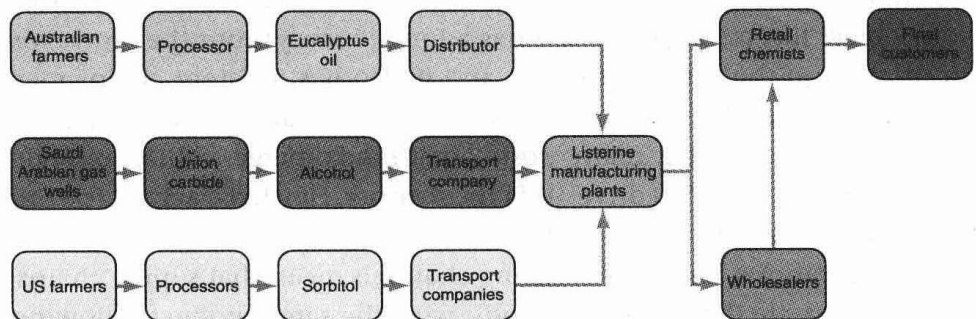


Figure 1.7 Outline of the supply chain for Listerine